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Controlling Sustainability in the Cotton Supply Chain

-A study of KappAhl, Nudie Jeans Co. and the Ecocotton Company

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Abstract

Sustainability and environmental issues have during the last decade earned a lot of focus in the mass media, but also in western politics where green parties exists in almost every country. This trend is also visible within companies and organizations worldwide, where many have developed some sort of corporate sustainability standard and issue reports in addition to their annual reports on financial figures.

The cotton supply chain is one of the most complex supply chains, when flows in different industries are compared. Crude cotton is farmed by thousands of farmers in over 100 countries, on fields ranging everywhere from a few acres in size to hundreds of acres. After picking the cotton is collected in different ways in different regions and parts of the world and therefore difficult to trace to individual farmers in many cases.

The textile supply chain includes climate issues concerning the ecosystem, farming, transportation, social issues like health issues and working conditions, production/manufacturing, consumer needs and demands, economical issues and profitability. This complexity is very typical for the cotton supply chain, and when adding sustainability to the supply chain, the complexity increases further. In order to keep track of your supply chain, and thus be able to guarantee the sustainability of the supply chain, a company needs to have control over the suppliers to whom they outsource their production.

KappAhl, Nudie Jeans and the Ecocotton Company, are three very different companies in size, target groups, product lines, and length and complexity of supply chains, but they all work towards an organic profile. Although they work with different goals of sustainability and at different levels in the supply chain, they all agree to the complexity and to the fact that it is impossible to reach 100 percent control over the environmental sustainability of the supply chain.

In our research we defined a number of issues influencing the level of control over the environmental sustainability in the cotton supply chains:

Management commitment, deciding what to do about the environmental issues and standards within the company and its supply chain, is one vital component in reaching a high level of sustainability. Many researchers define sustainability within a company and its supply chains a strategic issue that belongs high up on the corporate and top management agenda. KappAhl, Nudie and the Ecocotton co have all decided on different levels of environmental control regarding the supply chain, where the Ecocotton co aims to control every step of the supply chain from the cotton fields in Peru, to the finished product, while KappAhl and Nudie directly control the later steps in the supply chain, from the manufacturing level, and rely on international standards for the earlier steps.

The size of the company could add to the complexity, since large corporations, and preferably financially successful ones, tend to be more scrutinized by mass media and the public, and often has more supplier and sub-suppliers in their supply chain which could make sustainability and environmental issues harder to control. Size does not always decide the level of complexity, since larger

companies also have the means and resources to issue regular controls and control systems and they do not automatically have larger numbers of supplier, since it also depends on the size of your suppliers and what types of products and garments they sell and manufacture.

The number of stakeholders over all could add to the complexity, but also geography. Environmental issues are prioritized differently in different parts of the world, where the western parts of the world has up until now shown a greater interest in environmental hazards and risks than the countries in the third world, but we can also conclude that this is gradually changing. The stakeholders could be spread out all over the world, where there are different local rules and regulations concerning sustainability within the cotton farming and the manufacturing process; ginning, spinning, and the factories producing fabrics and ready made garments.

Adaptability and the ability to change is an important skill in a modern company, since market trends change fast. Also the economy and thereby the demand in the market for clothes change fast. The faster the company adapts to different changes, the more likely they are to obtain competitive advantages compared to other companies in the industry.

Communication and information flow within the company, but also externally towards the public and mass media and other stakeholders play a major role in obtaining full environmental sustainability. An open communication enhances the possibilities of transparency and also greater insights to the level of environmental sustainability and what needs controlling. Information that is rare, valuable, and irreplaceable and shared between different actors in the supply chain, can result in improved performance, as well as strong sustainable advantage. Having access to and sharing valuable environmental information can be useful to the entire operation, and also may be of benefit for other components of the supply chain, as well as peers in the industry.

Cooperation and trust are strongly linked together, and they are also linked to communication and information flow. Trust reduces complexity and uncertainty regarding the business partners and usually lead to greater intentions to cooperate. Trust is also considered to be a prerequisite for building strong partnerships and long-term relationships. In order to obtain trust in a business relationship it is important to communicate openly and frankly, and share information, both formal and informal. Ultimately there can be no trust without open communication and information sharing and at the same time there will be no cooperation or information sharing without trust.

It is important to decide which stages in the supply chain that are *within the company's control* and which are beyond the hierarchical control of the company. For example, you may have control over your direct supplier, but not over sub-suppliers

There is also an increasing demand from consumers to consider. However studies show that environmental demand spills over from one industry to another, causing a multiplying effect of industry regulations that stretches over several supply chains. Working hard at controlling the environmental

sustainability in your own supply chain, will have an effect on other supply chains within the textile industry and help raise the total level of environmental sustainability.

Both researchers and Bergman from the Ecocotton Company points out that the obstacles in obtaining an environmental friendly process and production within the supply chain are lack of standards, lack of knowledge and regulations, lack of a highly developed CSR policy and lack of market direction within the textile industry. One of the reasons probably being that progression in the environmental field does not include a direct nor a measurable payback, the benefits are more long-term and qualitative.

Finally, Kappahl, Nudie and the Ecocotton Company all agree that the most important factors in obtaining a higher level of sustainability within the textile industry and its supply chains, as well as a higher level of control over the environmental standard in the end, are; level of communication, information sharing, cooperation and trust, which all are connected, thus as said before, there will be no trust and no cooperation without open, honest communication and information sharing, and the other way around.

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1. Introduction

This thesis treats the issue of control within sustainable supply chains with focus on the cotton industry. The main question that we want to unveil is whether it is possible for producers within the textile/garment industry to have control over the supply chain regarding environmental issues, or not.

1.2. Background

The term sustainability from an environmental point of view was coined in the 1980's, and focused mainly on environmental issues and the legislating process of the same. However, environmental issues in Supply Chain Management were disconnected from the corporations until only ten years ago when researchers linked the two together and started focusing on Sustainable Supply Chain Management as their main concern. In the globalized world we live in today, where production is outsourced and transports are global, this is a very complex issue.

The supply chain within the textile, or rather cotton, industry is one of the most complicated supply chains there are, especially when considering the clothing industry with its many sub-suppliers (Muller, 2009). It is extremely hard to find out the origin of the cotton, especially when it is conventionally, or, as we will refer to it in this thesis, chemically, grown. The reason we decided to use the term 'chemically' grown fibers instead of 'conventionally' grown fibers is quite obvious to us, since there are few crops that are being as chemically treated as cotton, we simply feel that using the word 'conventional' is misleading.

Sustainability and environmental issues have during the last decade earned a lot of focus in the mass media, but also in western politics where green parties exists in almost every country and most other parties have an environmental program. This trend is also visible within companies and organizations worldwide, where many have developed some sort of corporate sustainability standard and issue CSR reports in addition to their annual reports on financial figures.

For many companies and industries, the greatest environmental risks lie upstream, i.e. with the suppliers to whom the companies outsource production. The reason for this is because it is not in the company's immediate control, but since it is the company putting their name on the label, it is up to them to control their suppliers. Today this control is especially important, because of the instant spreading of publicity, positive as well as negative, through the connection that Internet and the social media bring (Esty and Winston, 2006).

Because of the high set standards by the public, producers need to audit their suppliers in order to make sure that they are keeping up production standards to the level set by the producers; they need to keep control over their supply chain. Often the official reason for such an inspection is environmental or social, but it is

also common that the audit just establishes that the manufacturers and suppliers follow the rules and regulations in that particular country. These may not however live up to the standards set by the retailers, nor by the end consumers (Esty and Winston, 2006).

In order to keep track of your supply chain, and thus be able to guarantee the sustainability of the supply chain, a company needs to have control over the suppliers to whom they outsource their production. A company's control system can be based on a Key Performance Indicator, KPI, which is a measurement for efficiency for a company (Cetinkaya et al., 2011). For the KPI to be used correctly the company needs to focus on what is most important to them, i.e. what they want to measure the results of.

The textile industry is a vital industry, with the world's population estimated to reach 9 billion by 2050, a 35 percent larger population than today, with people who all will need to be fed and clothed. Cotton meets over 50 percent of the world's textile needs, but it is also one of the crops with the highest water and pesticide uses. There is therefore an ongoing debate within the cotton farming community of whether organic cotton can satisfy the future demand of cotton fibers or not, taking into account that chemical farming practices are more efficient and create far more output. At the same time there is a growing interest in environmental issues and demand for healthier alternatives and organically grown produces, especially in the western world.

1.3. Problem Discussion

According to Ha-Bookshire and Norum (2011) the word sustainability is often associated with environmental issues like energy conservation and climate protection. It is however also important to include the social and economic impact of business practices on sustainability. They feel that the textile and apparel industry is an excellent example when studying sustainability throughout the supply chain. The textile supply chain includes climate issues concerning the ecosystem, farming, transportation, social issues like health issues and working conditions, production/manufacturing, consumer needs and demands, economical issues and profitability.

The cotton supply chain is one of the most complex supply chains, when flows in different industries are compared. Crude cotton, after picking, is collected in different ways in different regions and parts of the world and therefore difficult to trace to individual farmers in many cases (Muller, 2009). This complexity is very typical for the cotton supply chain, and when adding sustainability to the supply chain, the complexity increases further. Controlling the sustainability level of the cotton supply chain is very difficult, because of its complexity, since supply chains in general are becoming more widespread and international and an increasing number of suppliers and sub-suppliers are involved (Welford, 2002; Brito et al., 2008).

The size of the company often decides the number of stakeholders involved, but not necessarily. Because of the number of details in clothing manufacturing, where a bra, for example, can include up to 40 different components from 40 different suppliers, the type of garments one sells often determines the number of suppliers (Interview with KappAhl). The difficulty to control the supply chain, and especially the sustainability within the supply chain, are determined by a variety of variables.

Companies should emphasize the influence they have over the participants within the supply chain, and the implementation and validity of the control system itself. It is, for example, important that the same standards, control systems, rules and regulations are used throughout the entire supply chain in order to maintain a sufficient level of validity. Kogg (2009) discusses that better control is obtained when companies cooperate towards common goals and standards, as well as through formalization and coordination of the control activities in the supply chain.

It takes an organized and strong company to address, control and monitor control systems continuously, to ensure alignment (Hse, 2005; Perl and Vorbach, 2009). Although, the textile and clothing producers in the western world can seldom be completely certain that the information they are receiving is accurate and have therefore no other choice than to trust the supplier as well as all the others involved in the manufacturing process (Andaleeb, 2009).

The closer you are to your suppliers, both geographically and in terms of cooperation or partnerships, the easier it should be to control the sustainability of the supply chain and also to influence your partners to agree on standards (Kogg, 2009). Different cultures, level of education, level of income, GDP per capita, local government involvement, local laws and regulations in different parts of the world matters, when it comes to how sophisticated the manufacturing is and how informed the companies and individuals working in the production are about sustainability problems. The western parts of the world are the most frequent consumers of garments and textiles. According to Allwood et al. (2006) at the University of Cambridge, about 1 trillion USD was spent on clothing consumption worldwide in the year 2000. About 7 percent of all the world's exports are in clothing and textiles. The consumption is split one third in Western Europe, one third in North America, one quarter in Asia, which leaves less than 10 percent being consumed in South America and Africa. At the same time developing countries account for half of the world's textile exports and three quarters of the world's clothing exports.

Just over the last decade the consumption and production of products have become an increasingly important issue for environmental policy programs. However, instead of looking at the individual consumer, focus has been put on the manufacturing process and the supply chain (Boons, 2002).

The western world in general shows a greater interest, both from the consumers and mass media point of view, in environmental problems, than people in the third world who battle problems of more urgent importance, such as increasing living

standards, or even just surviving the day (Kogg, 2009). On the other hand, level of education is increasing fast in for example China, and so are the living standards. This would suggest that the environmental awareness will increase, and the public interest in environmental issues and problems will increase (Brito et al., 2008).

Within every corporation or company, big or small, there is a constant flow of information, both from internal and external parties. All these parties are interested in different parts of the supply chain and usually have different agendas and different opinions on what is important and should be prioritized. Nevertheless, the flow of information is present everywhere, and how the information is collected, processed, and handled, is determined by the level of interest the company's top-management show in the questions regarding the environment. According to Kogg (2009) top management commitment and a company's approach to sustainability is vital in obtaining higher levels of sustainability in the supply chain.

The origin of the management's interest in environmental issues may also have an impact on how dedicated they are towards controlling the supply chain, improving standards, and cooperate with similar firms towards a greener industry. It might be built on the increasing pressure for the public, and therefore be a form of 'window dressing'. It might on the other hand be a genuine interest, which probably would lead to a greater involvement and a true engagement from the top-management. Cooperating and building strong relationships with different stakeholders increases the possibilities of obtaining a sustainable cotton supply chain (Zsidisin, 2001).

This support and commitment from the management mentioned above plays a central role when aiming to reach a high level of sustainability within a supply chain. It is also important to decide what level of control they have decided on, for example, whether to be fully organic, label the clothes with 'organic cotton' labels, or claim to have a high level of sustainability within the company, and whichever level they choose; what does that include? What level of control do they really have, where in the supply chain are the standards set, do they control everything from the cotton farm to the hanger in the store? What level do they consider sufficient, in order to be allowed to call themselves an ecological company or fully sustainable? The answers to these questions are likely to be as many as the number of companies you ask.

It is however certain that the commitment from the management has to be present for a company to reach any level of sustainability within the supply chain and amongst its stakeholders. Both Kogg (2009) and Lee (2004) refer to the importance of top management commitment and that the environmental issues have to be on the top management agenda in order for changes towards increased sustainability in the supply chain to take place.

The impact the industry has on the environment will also affect the interest from the public and the scrutiny from mass media. The textile manufacturing industry is one of the biggest in the world, employing around 300 million people worldwide (www.kappahl.se) and manufacturing 250 billion garments every year (Interview

with the Ecocotton Company), but it also has a massive impact on the environment with its high usage of chemicals and water. Also the size of the company will probably affect the interest from consumers and mass media. The larger the company and the more successful profit wise, the more interest from external parties are shown. A small company can however, if deciding on a truly ecological concept, attract more interest and maybe attract a target group that the big firms miss.

Although it is difficult to be in complete control over the supply chain, all companies, big or small, can contribute and make a difference in making the world a greener place and drive change towards a more environmental friendly cotton clothing manufacturing. Even small companies that are relatively small clients with the big manufacturers can cooperate with other companies and create a bigger demand for environmental friendly produced clothing. Also small and big firms can choose their suppliers not only according to price and quality, but also according to environmental standards and award the companies that work towards more environment friendly production with more business. The higher demand for environmental standards and production will eventually affect the suppliers. Not all firms will fit into your system, and therefore a selection and valuation of the suppliers is necessary if a company aims at a high level of environmental sustainability (Forman and Jorgensen, 2004; Perl and Vorbach, 2009).

1.4. Problem Description

Developing countries play primary roles in production and developed countries play primary roles in consumption. However, since we have had an economic shift from production of textiles and clothes in Europe, to low cost countries in Asia, South America and Africa, the general awareness of the impact that production has on the environment has decreased. This is simply because of the generally lower education levels in developing countries (Bonacich et al., 1994; Brito et al., 2008).

The intense focus from media on social responsibility has resulted in less talk about the environmental responsibility. However, it was because of the mass media the general public started to notice weaknesses in the supply chain. The social issues often poses stronger ethical challenges, since climate change, waste disposal, and resource management are problems that develop over a long time and have long term effects. These problems are often also hidden behind common practice and multiple contributors (Esty and Winston, 2006; Kunz and Garner, 2011).

The three pillars of sustainability are the reconciliation of economical, social and environmental demands. We feel that we want go in depth into one of these areas when focusing on the three companies and the discussion of the findings and have therefore decided to focus on the environmental aspect alone.

We want to investigate the layout of the supply chains for three clothing companies, closely related to Sweden, and how the management of these chains looks. Our angle

is to look at this from an environmentally sustainable point of view, see what the theory says and discuss the implementation of the companies' sustainable supply chain management from a theoretical perspective. The main goal is to find out whether it is possible for a supply chain to be fully sustainable without the company itself owning the entire chain, from cotton plant to a garment in a retail store.

The main question of this thesis is to find out to what extent Nudie Jeans, KappAhl and the Ecocotton Co's Sweden feel that they have control of the environmental sustainability within their cotton supply chain, and the more general question is if a company ever can obtain 100 percent control over their supply chain. We further want to investigate whether the companies feel that they have a weak spot within their supply chain, and also what they feel is realistically manageable to be in control over the environmental aspects of a sustainable supply chain.

We will define the cotton supply chain and ask the three companies how they handle each step in their purchasing process. Again, do they have control over the supply chain and its environmental sustainability from the cotton filed to finished garment in the retail store? If not, where are the weaknesses?

1.5. Aim
The aim of this thesis is to describe how clothing companies in Sweden, or closely related to Sweden, perceive their abilities to control the environmental sustainability within their supply chain.

1.6. Limitations
In order for this research to be manageable we needed to make some limitations to our original idea, otherwise it would have been too extensive. The limitations that we decided upon are listed below.

Sustainability: We decided to focus on the environmental aspect alone, and not focus on social aspects or financial issues connected to the supply chain.

The textile industry: The textile industry is one of the biggest industries in the world; we have therefore decided to focus on cotton alone. Further, we have decided to choose three Swedish clothing companies in order to limit the industry further.

The supply chain: Since cotton is produced in over 100 locations in the world, we have decided to look specifically at the countries where our chosen companies keep their production. Further we have chosen to focus on the pre-consumer phase of the supply chain, thus it ends at the retailer.

Logistics: We have, out of restraining purposes, decided to exclude the transportation phase of the supply chain, since it has too much to do with logistics. On top of this we find that the area is too broad for us to include, especially since we would not calculate any carbon dioxide emissions, or similar.

1.7. Definitions

Before getting to deep into the theoretic part, it is important to gain the knowledge of some practical terms that we will use in this research, which follows:

Best Practice: Method that constantly provides results that are superior to other results that have used alternative methods. Best practice stays best practice until someone gains a better result using a different method. This term can be used as a benchmark. (www.businessdictionary.com)

Buyer/Purchaser: The component that orders a product to sell to the consumer or business-to-business market. (www.businessdictionary.com)

Key Performance Indicator (KPI): Measurement used by companies or organizations to determine their performances to a strategic goal. (www.businessdictionary.com)

Supply Chain: A system of actors moving a product from supplier to consumer, from raw materials to end product. (www.businessdicationary.com)

Sustainability: The responsible management of resource use in order to attain a long-term preservation of the planet's wellbeing.

"Sustainable means using methods, systems and materials that won't deplete resources or harm natural cycles" (Rosenbaum, 1993).

2. Methodology

In this chapter we want to create understanding of the methods we used in order to collect the information necessary for this research paper. The research methodology and sample collection is described to explain the data collection process.

2.1. Research Methodology

When doing a study one must decide on whether to do a quantitative or a qualitative research. According to Trost (2004) the purpose of the study is essential when deciding this choice of methodology. He further proposes that if one intends to find out a frequency of a particular area, what is called hard data; one should use a quantitative study. However, if one wishes to understand a habit or reveal a pattern, a collection of soft data, a qualitative study is a better choice.

For our interviewing techniques we decided that a less standardized, semi-structured technique would provide us with better answers than a standardized without structured. Structure in this context means that one keeps to the subject and does not discuss anything outside the framework of the interview. This approach, with a low degree of standardization and a medium high degree of structure is very commonly used in research situations (Trost, 2004).

2.1.1. Qualitative Method

According to Patel and Davidsson (2003), the main purpose of using a qualitative method is to create a deeper understanding of a discovered area and phenomenon. Flexible methods and a wide variety of collecting information are used to reach this understanding, preferably close to the source. Using a qualitative method helps to create an overview of the problem and putting it into context. There is also a wish to create a deeper understanding of the writer's interpretation of the information (Holme and Solvang, 1997).

Based on this information we have decided to use a qualitative method to best collect information for this thesis. Our empirical study will be based on interviewing one relevant person within each of the three companies that we have chosen. We will further research the sustainability standards that the companies use in order to get a deeper understanding of the control of the their supply chain.

2.2. Sampling

In order to carry out an extensive and thorough research within the area of control within the environmental sustainable supply chain of cotton, we had to be very careful when selecting our respondents. In this part we explain the process of choosing which companies to interview, as well as deciding which person at each company would be best suited to provide us with answers to our questions.

2.2.1. Selection of Companies

When deciding on which companies to contact we had a few factors in mind. Firstly we wanted to have three different sized companies, a large, a middle-sized, and a small. Secondly, we wanted these selected companies to be Swedish, or have a close connection to Sweden, and lastly we wanted them to have an environmentally friendly profile. For the larger company we had three or four to choose from, but when studying them closer we found that KappAhl has a lot of focus on organic cotton and also keep up individual development project in order to improve their green supply chain. This was something that we found very interesting and wanted to find out more about. We therefore decided to contact Eva Kindgren, the CSR and Quality Manager at KappAhl.

For the middle-sized company we had a many interesting choices, but Nudie Jeans stood out, partly because of the convenient location here in Gothenburg, but mainly because their frequent use of organic cotton. The fact that they have a policy where you hand in your old pair of jeans and they give you 20 percent off your new pair, made them more interesting since it is a great example of an innovative solution for the post-consumer problem in the later part of the supply chain. We wanted to discover if we could find more of that creative and innovative thinking within the company.

We now had two companies that we were very happy with and we were contemplating whether to pick an even smaller company than Nudie Jeans or to let

Nudie Jeans be our smallest company. Suddenly we stumbled upon the Ecocotton Co where we found something different, they do not in fact own their own cotton fields, but have exclusive contacts with 360 independent farmers in Peru, who grow ecologically farmed cotton for the Ecocotton Co alone. This made us very intrigued. Here we had something clearly different from the other companies, expect from size, where we could investigate what we hoped would be a completely different supply chain.

Before each interview we spent some time researching the companies in order to be prepared and possess a deeper understanding of the company beforehand. This would help us steer the interview in a desirable direction and also follow up an answer with an interesting second question.

2.2.1.1. KappAhl
KappAhl is one Sweden's leading fashion chains with over 360 stores and 4 800 employees in Sweden, Norway, Denmark, Finland, Poland, and the Czech Republic. During the fiscal year of 2009-2010 KappAhl's turnover was estimated at 5.1 billion SEK and the operating profit was 551 million SEK. Their vision, which they work with continuously, is: 'KappAhl is to be a significant fashion chain in Europe'. In order to achieve this, they have realized that it does not merely mean being successful from an economical perspective, but also to be successful with long-term sustainability.

KappAhl has been working with sustainability in all different areas of the supply chain for almost 20 years. In 1999 they became the first company in the world, within the clothing industry, to receive an environmental certification, the ISO 14001 Standard.

Their CSR vision is 'KappAhl is to be a leader in CSR among the major fashion chains in Europe'. In 2010 one of KappAhl's goals was to increase their number of environmentally friendly fashion garments to 15 percent. By the end of the year it was shown that they had reached the goal and exceeded it with another 3 percent. This counts to a total of approximately 10 million pieces of clothing, which makes KappAhl the second largest eco fashion company in Sweden, with 9.7 percent of the eco market.

One of KappAhl's strongest tools is their Code of Conduct, which also is applied strictly to their 250 suppliers. In the second quarter of 2011, KappAhl left BSCI[1] (The Business Social Compliance Initiative), which they had help founding. The reason for the separation was simply because KappAhl wanted their own inspectors to carry out their controls instead of them sent from the organization. In previous years, KappAhl had brought in their own inspectors as a compliment to the organization's inspectors, because they considered their controls too infrequent.

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[1] From www.bsci-intl.org: 'BSCI is a service open to all retail, brand and importing companies committed to improving working conditions in the global supply chain.'

KappAhl's CEO very explicitly points out that the spirit of CSR lies in the entire company. It is something they feel necessary partly because they feel the demand for it, and partly because they feel that it is their moral obligation as a part of today's society. The decisions are made in the top, but the initiatives come from the individual at all levels of the organization. The CEO also explains that his part in the CSR engagements of the company is simply to make sure that the people responsible are doing their jobs. (www.kappahl.se)

2.2.1.2. Nudie Jeans
Nudie Jeans have set a high standard and their aim is to use 100 percent organic cotton when manufacturing their jeans. As stated on their web page:

'In order for cotton to be organically certified, the fields where it is farmed must be totally free from pesticides for a period of three years. At the denim producer, the spinning, dyeing and finishing of the yarn for our organic jeans, is carried out in accordance with organic procedures. When it comes to Nudie Jeans, organic cotton is not just a seasonal fashion trend. We have higher aims than that – our long-term goal is to use exclusively organic cotton.'

The majority of the denim used by Nudie Jeans is certified by GOTS and is therefore certified as organic. Nudie Jeans is a member of, which is a non-profit organization that supports the farming and trading of organically grown cotton.

The company Nudie Jeans was founded in 2001 and the head office is located in Gothenburg. In 2010 they showed a turnover of 348 million SEK, with a bottom line profit of 25 million SEK. The number of employees amounts to 31.

Nudie jeans has achieved Swedish Eco label 'Good Environmental Choice' ('Bra Miljöval') for their re-use of second hand jeans. The idea is to give each customer, who leaves a pair of used jeans when purchasing a new pair, a discount. Nudie jeans then repairs and remake a 'new' pair of jeans that they sell in their stores under the label 'Good Environmental choice'. They say that the cotton fibers in fabrics last much longer than we tend to use a pair of jeans, and are therefore excellent to re-make and re-use.

Nudie Jeans are sold in 1 565 retail stores in 29 countries. All denims are made in Italy and Turkey. The producers of Nudie Jeans create slow denim, also known as selvage denim. The denim is produced using old-style shuttle looms, which are ten times slower than modern looms that are used for chemical denim. Only the best raw materials are used which makes the fabric more expensive, but also more durable.

Nudie Jeans do not own any of the factories where the garments are made, but they work with very few partners. (www.nudiejeans.com)

2.2.1.3. The Ecocotton Company

The Ecocotton Company is a Peruvian company with a head office in Lima and a representative office in Borås, founded by Stephen Bergman in 1986. The company does not own any cotton fields or any land themselves, but work with 390 individual, autonomous cotton farmers in Peru via contracts. The fields vary in size from 2-12 acres and the idea from the beginning was to help make the farmers independent and self-sufficient, and to teach them how to grow cotton organically.

The Ecocotton Company was founded when Stephen Bergman was importing industrial yarn from Peru in the 1980's because he wanted to raise the standard of production and introduce a method that was truly sustainable and non-hazardous to both humans and nature. Peru has always been known for high quality cotton and textile products and the idea was to introduce the companies in Sweden to a sustainable way of producing cotton and cotton materials, and thus find a new way of profiling Swedish quality and at the same time compete with the cheaper imported cotton materials.

Bergman then conducted a series of studies on how to go about farming organically and how to work with sustainability throughout the entire cotton supply chain and thereby guaranteeing sustainability. The industry had started referring to cotton production as 'the next ticking bomb' from an environmental perspective. Even so, the response from the Swedish manufacturers was not overwhelming at this time. However, in the beginning of the 90's the eco-trend was introduced in the fashion industry, which increased the demand for organically grown cotton within the entire industry, and thereby favored The Ecocotton Company.

According to The Ecocotton Company, they were in 1986 the first and only clothing company worldwide to offer all garments in truly organic cotton and sell them commercially. Today the company still is one of the largest producers of organic cotton in the world, and they produce 57 percent of all organic cotton grown in Peru.

'White Cotton' is a certified brand for organic cotton and is owned by The Ecocotton Company, and has produced cotton in Peru since the company was founded in 1986. (www.ecocotton.com)

2.2.2. Selection of Respondents

From KappAhl we decided to contact Eva Kindgren, who is the CSR and Quality Manager. We felt it was important to choose someone who works closely with the constant development of sustainability questions and who has a good insight in the environmental aspect of the cotton supply chain.

When contacting Nudie Jeans we found that they in the last month had appointed a new head of CSR, Sandya Lang. Our main concern with this was whether she would have enough insight in the company, but once we met her, our concerns were erased.

Since Ecocotton Co's Sweden is a small family owned company, we felt that the decision of who to contact was obvious, and we ended up contacting the CEO Marcus Bergman.

2.3. Data Collection

There are two different types of data, primary and secondary data, where primary data is what the researcher collects for his specific project and secondary data is what someone else has collected previously, but might still be relevant for the study at hand. Examples of primary data are interviews, surveys, and observations and secondary data involves articles, books, etc.

2.3.1. Primary Data

The primary data is based on our interviews with the three companies that we have chosen, because this is the approach we thought best suited for our purpose since we wanted a deeper understanding of the companies. All three interviews were conducted face-to-face and took 60-90 minutes. For the interviews with KappAhl and the Ecocotton Company we met in their offices, and the interview with Nudie Jeans took place in a café. Both of us were present at the interviews with KappAhl and Nudie Jeans, but unfortunately only one of us was able to make it for the interview with the Ecocotton Company.

We thought that we would have to ask many questions in order to get to information that was of importance to us, but to our relief all of our three candidates were more than happy to tell us everything that we needed to know. During the interviews with KappAhl and Nudie Jeans we both took notes simultaneously, as our interviewee spoke. This was a very good method for us, since we then could compare notes and reflect upon what the interviewee had said, whilst getting an overlook of the interview. When the empirical text for each company was finished we sent them to the respective respondent, who then could read through it to make sure we had not misinterpreted anything.

Since unfortunately only one of us could attend the interview with the Ecocotton Company, one might question the reliability of that interview. We would however claim that since Markus Bergman read through the text himself and found it accurate, this remark should be disregarded.

When analyzing the results of the interview one of us wrote a summary of the interview based on her notes, which she then sent to the other person. This person then went through the summary based on her notes from the same interview, and if she found that something was inaccurate or incorrectly put, she would change it herself and then send it back to the first person, who then would read through it again. Because of the thoroughness obtained by the two individual notes, we feel that we can claim our empirical study to be trustworthy.

2.3.2. Secondary Data
When collecting secondary data we primarily used the Business Library at University of Gothenburg. The search engines that we used the most were LIBRIS and GUNDA, but we also used SUMMON, where common search words were 'sustainably supply chain', 'cotton supply chain', 'sustainable cotton', and 'supply chain control'. All the collected secondary data then was analyzed, structured, and finally became our theoretical frame of references.

2.4. Method of Analysis
When choosing a method of analysis we looked at Patel and Davidsson (2003) and their description of the three ways of relating to the theoretical frame of reference gained from the empirical study; induction, deduction, and abduction. The first, induction, is where the theory is where you build your theoretical framework upon the empirical studies conducted. The opposite is true for deduction, which is the classical research method, and originates from theory that is applied to the empirical research to see whether the theory is consistent with the reality. Abduction is the combination of these two methods, starting with a deductive theoretical hypothesis, which is followed by an empirical study in order to make sure that the theory can be applied to reality. This research then results in a further development of the theory (Patel and Davidsson, 2003).

In this study we have used a deductive research method. We formulated our problem for the research, to which extent companies feel that they have control over their sustainable cotton supply chain, which is our theoretical frame of reference. This has also been the groundwork for the interviews that we have had with our companies. Our mission with this study is to see whether the theoretical studies that previously have been conducted within the area of control within sustainable cotton supply chains are true to our empirical study.

3. Theoretical Frame of References

In this part we shall bring forward the theory that previously has been conducted in order to better understand the issues of controlling the supply chain. We will start with defining the concepts separately, since it is of great importance to understand each concept of an environmentally sustainable cotton supply chain in order to comprehend the complexity of the combination of the components.

3.1. Central Concepts

3.1.1. Sustainability
The word sustainability gets over 98 million hits on Google in 0.19 seconds, and the term from an environmental point of view was coined in the 1980's.

To sustain is derived from the Latin *sustinere* (*sus,* up; *tenere,* to hold), which is the exact meaning in English, to uphold, to endure (Collin's Dictionary). The Brundtland Commission of 1987 defined sustainable development as; 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' i.e. *financial* prosperity in the long-term cannot be achieved at the expense of the planet (*environmental*) or its people (*social*). They pointed out that the three pillars of sustainable development are economic sustainability, environmental protection and social responsibility. Each of these three pillars must be sustainable in order for the development to be sustainable (UN report, 1987).

3.1.2. Cotton
Cotton is grown in more than 100 countries in the world. The biggest producers are China, United States, India, Pakistan, Uzbekistan, and India where 75 percent of the world's cotton is produced (www.wwf.se). In 2005 the harvested raw cotton was estimated at 24.4 million tons worldwide (Fletcher, 2008).

Unfortunately, there are many downsides of the cotton production. While the area of plantation has not changed much in over 80 years, the output has tripled, due to large quantities of fertilizers and pesticides (insecticides, herbicides, fungicides) (Fletcher, 2008). Also, cotton is a very thirsty plant and it can take more than 20 000 liters of water to cultivate one kilo of cotton (www.wwf.com), this number depends on where in the world the crops are, as well as the infrastructure of the watering systems (Fletcher, 2008).

Cotton is a demanding crop to grow since it both needs a lot of water and attention. The crop is very popular amongst pests, and because of this it is one of the crops that use the most pesticides, endangering both humans and the environment. In 2005 cotton producers globally used approximately US $2.6 billion worth of pesticides, which accounts to more than 10 percent of the world's pesticide use, according to Pesticide Action Network (PAN, 2005). These high levels of toxics are the greatest sustainability challenges in chemical cotton production (Lakhal et al., 2008).

The more chemicals that are being used, the more resistant the plants and the soil and the insects become, leading to exceedingly poisoned soils and water supplies, it can even contaminate the ground water. Toxic substances, like heavy metals, stay in the ground and it takes a long time for the area to recover (www.ecocotton.com). This nitrate contamination of the water leads to deoxygenation through the accelerating growth of algae and other aquatic plats, which leaves the water in a state where it cannot support any animal life (Fletcher, 2008).

3.1.2.1. Organic Cotton
The value chain in the organic cotton business include a very long, and sensitive farming process. For example, it takes 9 months to grow good quality cotton and it is a labor intense production, when picking by hand and protecting the plants from insects and weather.

When growing organic cotton the use of toxic chemicals, artificial fertilizers and artificial watering systems are completely eliminated. These areas, especially the pesticides that accounts for more than 50 percent of the total cost of cotton production, are the most costly. Through these eliminations, the cost for ecological production is reduced dramatically compared to chemical cotton (Lakhal et al., 2008). When growing organic cotton natural methods are used to avoid pests, weeds and disease. Such methods include planting trap-crops between the cotton plants, which also attracts beneficial insects.

More farmers are converting to fully accredited organic production, now with over 1 percent of all cotton farms, but the process is costly and slow (it usually takes three years to convert). Unfortunately, many farmers are already struggling to stay on their land and the organic certification costs money, and if they do not get that money from an organization the farmers do not get the opportunity to switch to the organic option (Fletcher, 2008).

The transit from a traditional cotton production to ecologically farmed cotton takes three years. Ecologically grown cotton is usually harvested once a year, while traditional farming can produce three harvests a year, hence providing farmers with a greater output and profit. In the short term it can be difficult to convince, sometimes illiterate, farmers in the third world to think long term and care for environmental issues when they might be struggling with providing food to their families. However, most farmers are interested in converting because of the personal benefits of not being intoxicated by the hazardous fumes the chemicals bring (Interview with Nudie).

On the downside, the labor costs increase, because the cotton needs to be weeded manually. Furthermore, productivity is usually less then for chemical cotton, up to 50 percent. Consequently, there is some skepticism in the fiber industry about organic cotton being the true replacement for chemically grown fiber. Lower yields require more land to meet the demand (Fletcher, 2008).

3.1.3. The Cotton Supply Chain
The different stages of cotton garment production are:
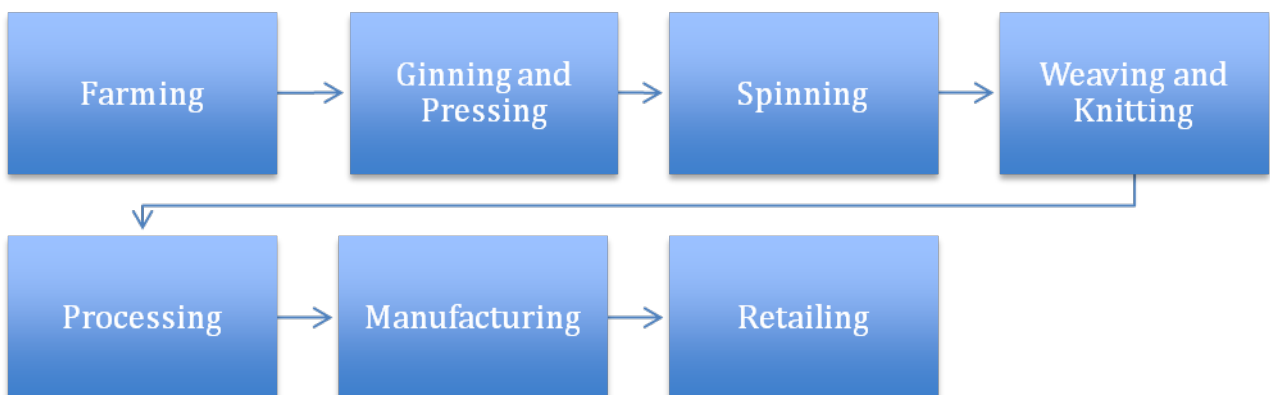
Source: BCI section 2D Supply Chain Dec 2009, Figure 1

Farming: This includes the growing and harvesting of seed cotton (the stage where the cotton is plucked) (BCI, 2009). The main environmental harm is the pesticides used on the plants to get rid of the pests, which affects the biological diversity, and the surface and groundwater quality. Another environmental issue is the amount of water being used to water the plants (Banuri, 1998).

Ginning and pressing: In this step the cotton balls are cleaned from trash and cotton seeds, which requires large amounts of water. The clean raw cotton is then pressed into bale of cotton lint (BCI, 2009).

Spinning: In the spinning process the cotton is transformed from lint into yarn. This process entails mostly dry processing and virtually no damaging effects are generated (Banuri, 1998).

Weaving and knitting: Through weaving and knitting the yarn, the cotton here becomes fabric. The main environmental harm in this step is in the weaving process where starch is applied to the fabric to add strength and stiffness (Banuri, 1998). This results in wastewater that contains large amounts of starch with high Biological Oxygen Demand (BOD) values, which is an indicator of pollution strength in the wastewater (Yusuff and Sonibare, 2005).

Processing: The processing of the fabric involves washing, dyeing, and finishing of raw fabric. The main environmental impacts in this step are the discharge of untreated effluents into water and soil, both liquid effluents from washing, dyeing, and bleaching operations contain organic and inorganic chemicals, and suspended solids, such as fiber and grease. Another great concern is the large amount of water being used (Banuri, 1998).

Manufacturing: In the manufacturing step are the consumer products, such as jeans, sheets, T-shirts etc., created (BCI, 2009).

Retailing: The retailing of the consumer products includes distributing the garments to the different retailers and selling the final product (BCI, 2009).

According to BCI the lynchpin of the environmental sustainability of the cotton supply chain is the ginners, therefore they always seek to identify the ginners in each region, in order to trace the cotton back to a certain area and farmer, to secure quality and fair production of the cotton seeds.

However, this is not as easy as it sounds. The image below shows the complexity of the cotton supply chains and the different flows. In some areas and countries in the world it is impossible to trace the cotton back to the individual farmer, since the cotton is collected in villages or other collecting points, where it is mixed and pressed together into bales. For a larger image, see Appendix 2.
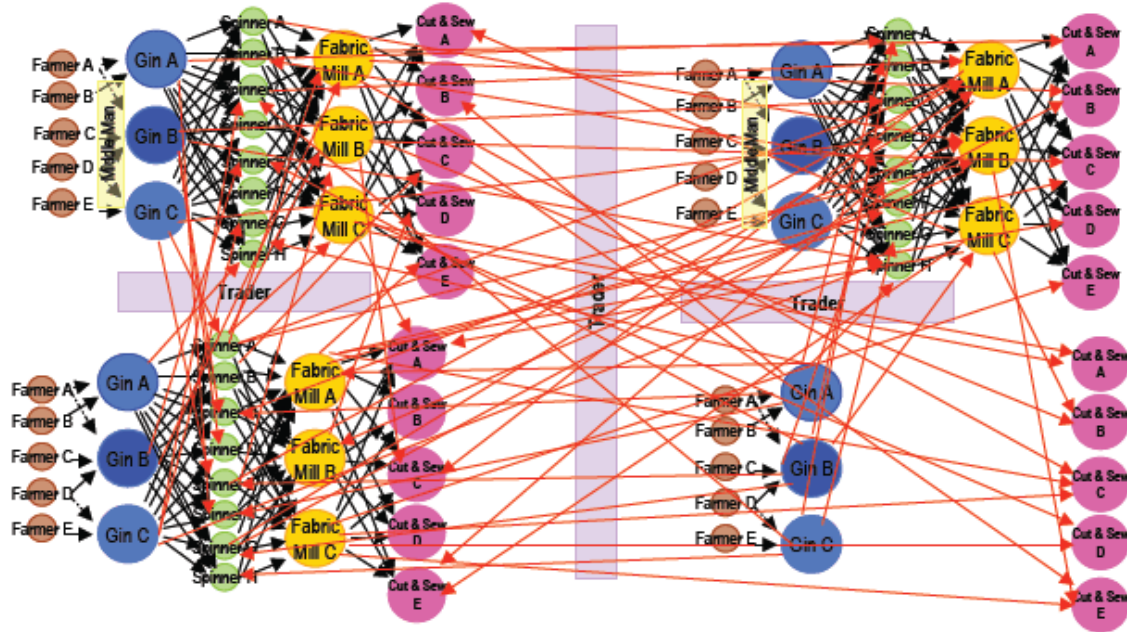
Source: Muller (2009)

3.1.3.1. Varieties of Cotton Supply Chains

It is difficult knowing which cotton bale contains cotton from which farm or even village once it is transported from the fields. The main reason for the cotton being mixed, except that it is more convenient than keeping everything separated, is that different cotton has different fiber lengths and through mixing different lengths you can create the perfect fiber length for a specific garment (Interview with KappAhl).

Unfortunately there are no rules or laws of how these fibers can mix and therefore it is impossible to trace the cotton back to its origin. Muller (2009) has therefore divided the varieties of cotton supply chains into three categories:

Firstly there is the segregated category, where the cotton is segregated and farm-level origin can be traced. Cotton from a certain farmer goes to a certain ginning and pressing mill and ends up in a bale that can be traced back to that specific farmer (e.g. Brazil).

Secondly, the coordinated category, where several farmers sell their cotton to a central entity, that provides inputs, credits, transportation and purchase. The central entity may hold exclusive rights for cotton in that area (e.g. West Africa). The cotton may be traced back to a certain area, or village, but not to a specific farmer.

Thirdly we have the aggregated category, where farmers sell their cotton to different villages, merchants or local markets where the cotton is mixed several times, which makes it almost impossible to trace a certain bale back to a farmer, or even village or area (e.g. India and Pakistan).

Organizations working with cotton (such as BCI) aim to establish an auditable system that segregates cotton origination to village level, so that it at least is

traceable back to a certain area and village. Each transaction will then be documented and the cotton is weighed after picking, after being transported to the gin and again when it is packed into bales in the form of lint (BCI, 2009).

3.1.3.2. Problems with the Cotton Supply Chain

Over all in the textile industry there is a common lack of control, compared to other industries producing consumer products (Cetinkaya et al., 2011). For example, in the textile industry there are no rules or regulations demanding information about the origin of products, like in the food industry. Also, within a lot of other industries, there has been a clear trend the last few years towards technical processes, which optimizes flows towards a lean manufacturing process. In those manufacturing industries and plants, the product history and origin plays a major role, something that unfortunately not yet have been adopted by the textile industry, which lacks the knowledge and systems for tracing raw materials (Interview with Ecocotton Co).

Furthermore, the crude cotton is anonymously traded, and prices are set based on the speculation on the raw material stock market. The prize or the exclusiveness of the finished product says nothing about the sustainability, nor the money spent on the production process. There is not necessarily a relation between a high prize and high quality, from a sustainability point of view (Interview with Ecocotton Co).

The textile and clothing industry uses a migrating production that constantly is moving and looking for increasingly cheaper production sites and countries. According to Bergman, it is easy to move from one country to another, because the sewing and handling of textile materials is an old industry, and requires very little education and low demands on hygiene, unlike many modern industries, i.e. the computer or medical industry (Interview with Ecocotton Co).

3.2. The Concept of Control

Control is necessary, and considered a fundamental management activity, intended to help companies reach their goals and perform as well as possible (Anthony, 1965; Green and Welsh, 1988; Jaworski, 1988; Lusch and Jaworski, 1991; Andaleeb, 1995). By gaining control over the members in the supply chain, and their behavior, uncertainties regarding results is reduced (Andaleeb, 1995).

There is a downside to thorough controlling, besides cost, it might lead to less flexibility and also a high degree of control could imply to the suppliers that there is a lack of trust from the buyer (Andaleeb, 1995).

Pfister (2009) defines management control systems as 'the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives'.

3.3. Issues of Control within the Sustainable Supply Chain

A supply chain is a very complex process that is very difficult to control and when adding environmental sustainability to the equation, the complexity is increased immensely. The area of which factors affect how well the control is handled has been researched thoroughly. In this part we explain the environmental sustainability aspect added to the supply chain, followed by the most important factors of control, according to our research.

3.3.1. Supply Chains and Sustainability

In recent years there has been a great deal of interest, both in literature and amongst companies, in sustainability, CSR, and supply chains, which has resulted in an increasing interest in management control systems, controlling and supply chain management. The main reason for this is the increasing focus of products within environmental policy programs. Therefore many have moved from the production processes, to the product-oriented approach that focus on the complete product life cycle of a product (production, consumption and disposal), thereby involving the entire supply chain (Boons, 2002).

There has been much debate on what controlling is, especially when it comes to the definition of the matter. Anthony and Govindarajan (2001) and Seuring (2006) emphasize the process in which the members of the organization get influenced by managers to implement the company's strategies.

The debate has also covered the definition of Supply Chain Management and sustainability: continue; 'The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain. Supply Chain Management (SCM) is the integration of these activities through improved supply chain relationships, to achieve a sustainable competitive advantage' (Handfield and Nichols, 1999).

Linton et al., (2007), on the other hand, want to explain the issue as follows: 'A focus on supply chains is a step towards the broader adoption and development of sustainability, since the supply chain considers the product from initial processing of raw materials to delivery to the customer.'

The complexity of dealing with many stakeholders and coordinating processes, finding the right suppliers and interacting with different stakeholders globally, is not made easier when adding sustainability issue to the equation. Matos and Hall (2007) and Linton (2007) emphasize that the complexity increases considerably when integrating environmental sustainability into the supply chain. This is mainly because of the introduction of less quantifiable considerations relating to the natural environment.

3.3.1.1. Management Commitment

In order to obtain sustainability from an environmental point of view, Lee (2004) thinks it is critical that the issues are on the corporate agenda and that there is commitment from top-management. The company's approach to sustainability is vital; whether the goal is on ensuring acceptable levels of environmental sustainability, or is the subject deeply rooted within the company's profile, process and strategies, and their vision is to deliver thoroughly environmental friendly products (Kogg, 2009).

Cetinkaya (2011) stresses the fact that sustainability is a strategic issue, which requires the attention and commitment from top-management. Sustainability should be integrated in the corporate policy and strategy in the form of guiding principles and visions. The company's sustainability goals ought to be defined in concrete supply chain Key Performance Indicator (KPI) systems, based on a top-down approach (Cetinkaya et al., 2011).

Burt et al. (2003); Hall and Braithwait (2001); Bailey et al. (1998); Preuss (2005), all argue that there has been a change in how companies look upon their supply chains. There has been a transformation from focus on purchasing prices and continuity of supply, to a commercial orientation of cost saving, to the most recent view; looking at the supply chain as a proactive, strategic component, fully integrated into the competitive strategy of the company. This very positive change is accompanied by a long-term outlook on relationships with key suppliers, rather than viewing them as stakeholders or suppliers. These commitments that the long-term relationships involves usually are aimed towards partnerships. This trend could imply that it will be easier in the future to communicate within the supply chain and that it also will be easier to implement environmental programs and work together regarding standards.

The commitment from management does not necessarily evolve from an interest in environmental issues or a vision and dedication from the leaders in the company. Sometimes the commitment has its origin in pressures from parties outside the industry, for example mass media or the consumers. Petulla (1987) and Zsidisin (2001) go as far as saying that the effectiveness of environmental management within an industry mostly depends on outside pressures.

If being able to fully control sustainability throughout the supply chain, power and control needs to be centralized in order to organize and execute the necessary activities (Schary and Skjott-Larsen, 2001; Perl and Vorbach, 2009). Hse (2005) talks about formalization, i.e. the coordination of sustainable supply chains. It takes a strong purchasing company to address, control and monitor systems to ensure alignment with standards and sustainability goals. Standards, norms, directives and code of conducts need to be implemented and then regularly followed-up.

3.3.1.2. Size of the Company
The size of the company may have an impact on the power that the company has over its suppliers, where both large and small companies have their advantages and disadvantages.

Large companies have large purchasing volumes can therefore they usually make more demands and put more pressure on the supplier. They also have more resources to spend on experts and in-house representatives for ensuring environmental sustainability and follow-up. On the downside, they have large scale and therefore larger risk for organizational slack. This large supply base also comes with less flexibility, as it usually takes longer to implement change and align internal management, systems and processes (Kogg, 2009).

However, if the purchasing company is small, it may not have much impact on the suppliers when it comes to environmental demands, as the suppliers are not dependent on solely that company. It is therefore vital for small companies to form mutual partnerships, based on trust and dialogue, i.e. cooperation, in order to drive change towards a more environmental friendly process throughout the supply chain (Forman and Jorgensen, 2004; Perl and Vorbach, 2009). Small companies have on upside a smaller supplier base and smaller internal organizations, and with this come a higher degree of flexibility, which makes it easier to decide upon and implement changes (Kogg 2009).

Hall (2006) and Perl and Vorbach (2009) add another angle to the issue of the size of the company by stating that larger, profitable companies are more exposed to pressure from the public to increase their environmental performance through improving their control functions and setting higher standards. Hall (2006) confirms this argument by saying that the more pressure companies are exposed to, the more initiatives are taken to increase and maintain sustainability throughout the supply chain. This implies that smaller companies may lack the initiative to improve sustainability, if there is no pressure from parties in the supply chain, or customers (Perl and Vorbach, 2009).

3.3.1.3. Geography, Length of the Supply Chain, and Stakeholders
The length of the supply chain, i.e. the number of actors involved, and the geography, i.e. countries involved and their locations, also have an impact on the complexity of the chain and the possibility to obtain control. Few countries involved from the same part of the world, with similar cultures and laws and regulations are usually easier to control. However, supply chains are in general becoming more expansive and more international as companies are relying on an increasing number of suppliers and sub-suppliers. In fact, most supply chains cross national boundaries several times before reaching the store where the garment finally is sold to the end-consumer (Welford, 2002; Brito et al., 2008).

Kogg (2009) argues that based on Maslow's Hierarchy of Needs Pyramid (see Appendix 3) environmental concerns mainly arise in countries where people are well off and well educated and where they can afford to worry about the

environment. It can be referred to as 'a luxury problem'. People in third world in general may not understand the impact of pollution on the environment and might also worry more about putting food on the table than contemplating what long-term environmental harm the factories cause.

Evidently, environmental issues are prioritized differently on the agenda in different parts of the world. This is critical for a company to keep track of, depending on where in the world they operate. Many natural resources are over-utilized in undeveloped countries and a lot of goods are produced in low-cost countries, in these countries where general level of education is low, other issues than environmental sustainability might be prioritized. Currently Asia and Europe have different views on both corporate responsibility and sustainability, but the awareness of environmental problems and impacts is spreading east, resulting in increasing efforts towards sustainability in Asia too (Brito et al., 2008; Carter and Mol, 2006).

The stakeholders in a globalized supply chain can vary from just a few to thousands of stakeholders spread out all over the globe, which makes managing the supply chain extremely complex (Cetinkaya, 2011). Worldwide there are approximately 1 billion people with ancillary involvement in the cotton supply chain impacts (Esteve, 2010). In order to obtain control over the impact of their stakes and their influence on the business, there is a need to get an exact assessment of their risk and opportunity factors, also when it comes to environmental sustainability. Cetinkaya (2011) divides stakeholders into primary and secondary stakeholders, as shown below. For a larger image, see Appendix 4.
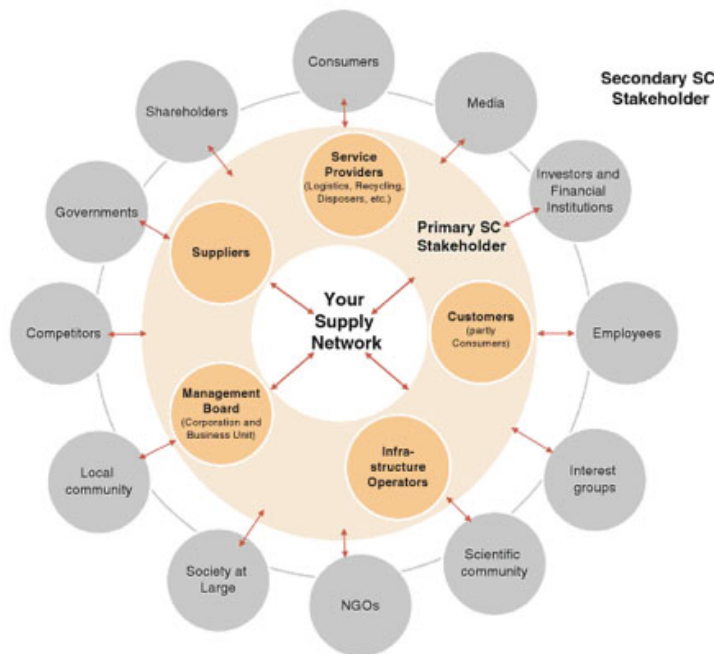
Source: Cetinkaya et al., Sustainable supply chain management, p. 36

Cetinkaya (2011) points out that the obstacles in obtaining an environmental friendly process and production within the supply chain are lack of standards, lack of knowledge and regulations, lack of a highly developed CSR policy, and lack of market direction. Progression in the environmental field does not include a direct nor a measurable payback, the benefits are more long-term and qualitative. Control over the chain may vary from time to time, since there may be evolving needs throughout the chain, especially within larger companies where suppliers are dropped or added according to changes and needs in production or consumer demands.

Hsu (2005) also stresses the fact that powerful companies within the supply chain can affect the others and help resolving conflicts and establishing guidelines and rules. A powerful supplier within the chain may guide other members towards a common goal (Hsu, 2005; Perl et al., 2009). Hall (2006) and Pearl and Vorbach (2009) add that innovation within the supply chain is dependent on one or a few strong supply chain members.

Another major component within the supply chain in order to drive change is a strong purchasing company, which awakens the demand for change in values, structure, and finally, action (Forman and Jensen, 2004; Perl and Vorbach, 2009).

From an environmental point of view is a reduced supply base, i.e. less number of suppliers, to prefer, since this provides better control and more common views. This is especially valuable when the companies who work within the same field of business cooperate and aim towards common goals and standards for sustainability, and where the actors have good insights into each other's operations. Better understanding of all the different actors in a supply chain and an increased insight in each other's businesses create innovation for environmental products and processes (Kogg, 2009).

Many companies do not take full responsibility for their products from production to the consumer. When looking at the stakeholder's perspective one must see that it is perhaps logical for a stakeholder to concentrate on its own part of the supply chain. This is however not the most sustainable way at looking at things. Results gained by Haugland and Grönhaug (1988); Korneliussen and Grönhaug (2003); Solér et al. (2010), show this exact problem; that exporters (suppliers) tend to concentrate more on production and attributes to the production line, whereas importers (purchasers) tend to concentrate more on consumer needs and product attributes closer to consumer preferences.

Seuring (2004) and Solér et al. (2010) talk about an eco-economic trade-off, i.e. the closer in the supply chain you get to the consumer, the level of trade-off between economic and environmental goals, depends on the environmental awareness of the consumers and buyers. There is an ongoing trend towards environmental awareness, which can be used as a competitive advantage for companies.

As expressed by Larson et al. (2000) and Brito et al. (2008): 'Sustainability can be used as a springboard to reach environmental and socially conscious customers', and for that reason they further argue that sustainability is not a trend and not likely to fade away.

A careful selection and evaluation of suppliers is necessary to maintain environmental sustainability standards, as some actors will not fit into the system (Forman and Jorgensen, 2004; Perl and Vorbach, 2009). Purchasers within the companies have to select and evaluate suppliers that have adapted an environmentally friendly profile if they want to uphold their standards. However, another solution for companies is to influence the processes of the suppliers in a more desirable direction and integrate the suppliers into environmental management initiatives (Walton et al., 1998). Research by Carter and Carter (1998), Carter et al. (1998), Klassen (1993) and Zidisin (2001) show that it is the purchasing professionals within companies who have the final impact on the environmenta, since they control the purchases. They also feel that it is up to these professionals to look at the entire life cycle of a product. Kellogg (1994), Carter and Carter (1998) and Zidisin (2001), however, claim that these initiatives must come from industries, not governments.

3.3.1.4. Adaptability and Ability to Change

According to Lee (2004), only supply chains that are agile, adaptable and aligned provide companies with sustainable competitive advantage. Lee refers these companies to as 'Triple A companies'. *Agile* companies react speedily to sudden changes in demand and supply, as well as they *adapt* over time as market structure and strategies evolve. Then they *align* the interests of all firms in the supply network so that the chain's performance is optimized when interests are maximized. This can also be applied to environmental issues and sustainability maintenance (Lee, 2004).

Cetinkaya et al. (2011) further argues that best practice companies are able to deal with trends and changes faster than their competitors; they are better at defining and analyzing problems and possible developments than their peers and also state that a key success factor in their supply chains is their broad end-to-end responsibilities. They take responsibility for the whole chain, which also could result in a success story when dealing with environmental issues, since managers in best practice companies are able to describe cause and effect relations in the supply chain with regard to environmental issues (Cetinkaya et al., 2011).

3.3.1.5. Communication and Information Flow

Good communication, using the same language throughout the supply chain, adds to the possibility of maintaining a high level of sustainability and working with environmental issues in a similar way everywhere in the organization (Kogg, 2009).

Before you can install environmental practices and make all supply chain members see the benefits, and uphold the standards properly, you have to make them aware and create the opportunity to see the environmental performance from a complete system perspective (Green et al., 1996; Zidisin, 2001). Key to create a wide

perspective is open communication, both within the company, and with suppliers, customers, industry competitors and government officials. Most production will have an impact on the environment. Key is to minimize the negative effects, and keep them in control. In order to assess the total impact, companies must look at the complete life cycle of products (Carter et al., 1998; Klassen, 1993; Zsidisin, 2001).

The cooperation and flow of information within the supply chain may help create a sustainable competitive advantage, as the supply chain within a company, depending on size, is becoming increasingly global and complex. It can be argued that whichever company manages and controls their supply chain most effectively and accurately, ends up number one in competition with others. The same goes for sustainability and the flow of environmental information, i.e. whoever cooperates most efficiently and controls the environmental information most accurately, ends up with more control over sustainability within the chain. Environmental information can however be used and perceived differently; depending on where in the supply chain purchasers and suppliers are located and situated (Solér et al., 2010).

Barrat and Oke (2007); Solér et al. (2010) claims that information that is rare, valuable, and irreplaceable and shared between different actors in the supply chain, can result in improved performance, as well as strong sustainable advantage. They further stress the importance of having access to and sharing valuable environmental information that can be useful to their operations, and also may be of benefit for other components of the supply chain.

If stakeholders in a supply chain have a valued relationship, they are more likely to exchange information. However, the quality of the information is important; it needs to be accurate and timely to be considered valuable and useful to the different actors (Moberg et al., 2002; Solér et al., 2010). When communicating to the markets there is, according to Kunz and Garner (2011), as much concern amongst business-to-business (B2B) as amongst business-to-consumers relationships.

When considering communication and information sharing openness is an issue that can make companies feel vulnerable (Andaleeb, 2005; Perl and Vorbach, 2009), but when it comes to improving sustainability, there is probably more to gain than to lose. Environmental information is usually more sensitive than regular information, but is nonetheless essential for a sustainable supply chain. When the stakeholders are willing to exchange environmental information, they will have more information about each other and be in a better position to learn from one another and improve sustainability throughout the whole chain (Yu et al., 2001; Perl and Vorbach, 2009).

More exchange of information is needed in sustainable supply chains than in chemical supply chains. This is simply because the participants in the sustainable supply chain exchange information to improve the environmental standards, and also because the suppliers need to be monitored and evaluated continuously (Seuring and Muller, 2004; Perl and Vorbach, 2009).

Information concerning the environmental issues within the supply chain is generated both internally and externally; it is therefore essential to exchange all kind of information along the chain (Schary and Skjott-Larsen, 2001; Perl and Vorbach, 2009). Due to the lack of information sharing throughout the supply chain nowadays, there are very few examples of truly sustainable supply chains, according to Young (2000) and Perl and Vorbach (2009). They claim that 'only when organizations in the supply chain begin exchanging information backward through their channels will supply chains discover more efficient, environmentally sound and profitable disposition solutions'.

3.3.1.6. Cooperation and Trust

There is a choice whether to address environmental challenges independently or in collaboration with other companies. When looking at environmental sustainability an increasing number of stakeholders have started realizing that they need to cooperate in order to solve the world's problems (Ansett, 2007). It is when cooperating, that common standards and systems for verification are created. In some respects it can be easier to decide and set your own standards, since common standards have to be agreed on and usually take longer to launch. On the other hand, working together may impact the whole industry and help raise the bar for more environmental processes throughout the chain (Kogg, 2009).

Preuss (2005) argues that well-functioning relationships in the supply chain is a must, not only when aiming at improving manufacturing practices and profits, or finding new creative solutions, but also for successfully dealing with environmental problems.

In order to be successful in your environmental work throughout a supply chain, it is necessary to work within the organization, as well as together with both the local governments, suppliers, customers and competitors (Carter et al., 1998; Zsidisin, 2001). Zsidisin continues to stress the importance of building strong relationships with stakeholders in the supply chain in order to proactively address problems and issues concerning the environment.

It is important that components within a supply chain cooperate and maintain the same standards concerning environmental practices. A commonly used expression, which fits sustainable supply chains perfectly, is that a chain is not stronger than its weakest link. Powerful firms within a supply chain may affect the others, however if one company is less dedicated to decreasing harmful environmental effects, the effort of another firm is mitigated (Walton et al., 1998; Zsidisin, 2001).

Zsidisin (2001) points out that true sustainability requires extensive cooperation within supply chains, as well as involvement of the purchasers. Processes and products that are truly sustainable must involve all trading partners. However, it is next to impossible to obtain 100 percent control over the sustainability of a company's supply chain. Regardless of how many standards, KPI's, check-up's and control functions are used; ultimately everything is based on trust.

Trust is a fundamental building stone in the supply chain: 'Perhaps there is no other single variable which so thoroughly influences interpersonal and group behavior' (Andaleeb, 1995).

The behavior of actors involved in relationships where they are dependent on each other, like in a supplier-buyer relationship, are influenced by the degree of trust that constitutes the foundation for the relationship (Andaleeb, 1995). He continues to suggest that a shift in power from the manufacturers to other members of the chain, where there is a game of power taking place, can generate mistrust in the channels of distribution and lead to trade difficulties. Lack of trust in a relationship, based on mutual dependence, makes the relationship fragile and unstable (Buzzell et al., 1990; Andaleeb, 1995).

Another way of describing trust is: 'a party's belief that its needs will be fulfilled by actions taken by the other party' (Anderson and Weitz, 1990; Andaleeb, 1995).

Andaleeb (1995) further questions whether companies can be considered trusting each other simply because they decide to work together. Instead he implies that it is possible for parties, even when they are dependent on each other, not to trust the other, since there is always a possibility for one of them to abandon the other.

Cooperation is regarded as necessary in a relationship consisting of different members (Brown 1981, Skinner et al., 1992; Andaleeb, 1995). Trust and dependence are related to cooperation in a positive way (Anderson and Narus, 1990), since higher levels of trust reduces complexity and uncertainty regarding the business partner's actions, and usually leads to greater intentions to cooperate. However, when the dependency between business partners is very high, they might choose to cooperate regardless of whether they trust each other or not (Andaleeb 1995).

Further trust is considered to foster the business partners and to be a prerequisite for building long-term relationships (Doney and Cannon, 1997; Skandrani, 2011). Skandrani (2011) continues to stress that trust in fact is the corner stone of strategic partnerships. To quote Perl and Vorbach (2009): 'When the business relationships are founded on trust and supportiveness, enterprises will have confidence in supply chain members and believe in their honesty and reliability.'

Anderson and Narus (1990) and Andaleeb (1995) emphasize that in order to obtain trust in a business relationship it is important to communicate openly and frankly, and share information, both formal and informal. There should be furthermore be full disclosure on objectives, motivations, evaluation criteria, policies and expectations in order for trust to develop between partners (Anderson and Weitz, 1992; Andaleeb, 1995).

There is a connection between communication, trust and inter-organizational knowledge sharing when working towards greener supply chains, which is shown in a research model by Cheng et al (2008). Obtaining green supply chains, involves

sharing 'green knowledge' and information from green manufacturing firms to their partners.

Finally, communication, trust and knowledge sharing are all connected. 'Communication is a major precursor of trust, and the accumulation of trust leads to better communication' (Morgan and Hunt, 1994; Cheng et al., 2008). The more trust is developed between business partners, the more honest and open communication takes place, as well as knowledge sharing, leading to increased trust. When there is a high level of trust between business partners, it should not be necessary to exercise extensive controls, since trust provides assurance enough (Andaleeb, 1995).

3.3.1.7. Within Company Control or not

It is important to decide which stages in the supply chain fall under the direct hierarchical control of the company and which are beyond the company's control. For example, you may have control over your direct supplier, but not over sub-suppliers. Those that fall under company control are most likely to be easier to control, follow-up and implement changes, than those that do not.

The supply chain is affected by a variety of issues, from both the internal organizations of each actor in the chain, such as human resource policies and product quality, as well as external organizations and stakeholders and the relationships amongst them, such as logistics and transport organizations. Beyond that, there is also an increasing demand from consumers to consider (Mentzer et al., 2001; Brito et al., 2008).

Companies who effectively manage internal and external relationships, functional and organizational, through improved coordination, are companies who perform well (Brito et al., 2008).

Kovacs (2008) reveals in one of her studies that environmental demand spills over from one industry to another, causing a multiplying effect of industry regulations that stretches over several supply chains. According to her, supply chains can be seen as mediators of industry regulation, because the environmental demands cross both industrial and geographic borders.

One can guess that if the demands come from several industries and new standards are set in these industries, this will also have an impact on local regulations and environmental laws, helping to raise the bar for use of hazardous substances that affect humans and nature.

Ultimately, if a company does not own or control the entire supply chain and all its stakeholders, or fails to continuously control the process to uphold the set standards, the level of sustainability in the environmental supply chain is determined by trust. Even if the company sets the standards, they still have to trust that the suppliers follow these standards (Hsu, 2005; Andaleeb, 1995).

3.4. Environmental Standards and Communities

3.4.1. ISO 14000
The International Organization for Standardization (ISO) have created two main 14000 EMS standards, the ISO 14001:2004 and the ISO 14004:2004, where the first provides the requirements for an EMS and the latter offers general EMS guidelines. The ISO 14001:2004 (further referenced as just the ISO 14001) is the most essential of the two when a company is creating a management tool. It encourages companies to identify their environmental impacts, through its production of product, services or activities, and take control over them.

Further, it enables companies to gradually improve their environmental performance through implementation of a systematic approach in setting environmental objectives and targets. This systematic approach becomes an incentive to actually achieving these goals and to demonstrating this achievement. (www.iso.org)

3.4.2. GOTS
The aim of the standard of Global Organic Textile Standard (GOTS) is 'to define world-wide recognized requirements that ensure organic status of textiles, from harvesting of the raw materials, through environmentally and socially responsible manufacturing up to labeling in order to provide a credible assurance to the end consumer'. GOTS have two different labels, 'organic', which must contain a minimum of 95 percent certified organic fibers, and 'made with organic', which must contain a minimum of 70 percent certified organic fibers.

The main idea of GOTS is to keep control over the critical areas of the supply chain, both environmentally and socially. Such areas of the environmental criteria include that organic fibers must be separated from chemical fibers at all stages in order to ensure that the end product contains an acceptable level of organic fibers. Further, all chemical inputs must be evaluated and records over toxics, water use, and energy consumption need to be kept at all times. For further information, visit www.global-standard.org.

3.4.3. Textile Exchange
The nonprofit organization Textile Exchange is a community for companies that creates and openness throughout the textile supply chain, from farmer to end-consumer. Its aim is to inspire and equip companies with relevant information for their sustainability practices to accelerate. Focus lies on minimizing the negative impacts and maximizing the positive effects of the textile industry through building competence, spreading information, and sharing best practices along the entire supply chain. (www.textileexchange.org)

3.4.4. BCI
The mission statement of BCI states that 'The Better Cotton Initiative (BCI) exists to make global cotton production better for the people who produce it, better for the environment it grows in and better for the sector's future'. BCI's focus on

environmental issues include improving soil health and biodiversity, reducing the impact of water and pesticide use on environmental health, and to increase traceability along the supply chain. (www.bettercotton.org)

BCI has since 2005 worked towards facilitating a solution for the mainstream cotton sector along with organizations from across the cotton supply chain and stakeholders interested in the issue. The philosophy is to create a market for Better Cotton, which will bring long-term benefits for the environment, the farmers, and other people dependent on cotton. (www.bettercotton.org)

4. Empirical Study

For our empirical study we met with our chosen company representatives individually in order to conduct our interviews. We wanted to unvail the issue of control within their cotton supply chain; how they look upon the matter and how they work with it.

4.1. KappAhl

We met with Eva Kindgren, CSR and Quality Manager at KappAhl, at the head office in Mölndal. Here follows a summary of the interview with her:

KappAhl is one of the leading 'fast fashion' companies in Sweden with almost 400 stores in five countries and a production of 60 million pieces of clothing each year. They employ approximately 250 suppliers with a total of 450 different factories each season. These suppliers are located mainly in Asia, roughly 40 percent in China, 20 percent in Bangladesh, and 10 percent in India. At all supplier locations KappAhl has their own office and staff, with a Swedish boss, since they want to stay true to Swedish fashion, mood and safety.

All designs, measurements, and patters are decided in Sweden, Mölndal, as well as the choice of which supplier is best suited to make the clothes, since all suppliers have different specialties. For KappAhl, the control of the supply chain starts at the manufacturing stage. They send their designs, measurements, and patterns to the supplier, who places an order with their textile factories for the textiles and then manufactures the garments in their own factories.

Out of the 60 million garments that KappAhl produces each year approximately 65 percent contain cotton. Unfortunately the control of which cotton that is being used is lost when bales of cotton from different locations are mixed in order to create the perfect length of the cotton fiber for a specific piece of clothing. Kindgren thinks that most of their cotton has its origin in India or China, but because the lack of rules and regulations of how the raw cotton can be mixed it is hard to say.

The biggest problem that KappAhl faces is the fact that the entire supply chain is so complex that it is impossible to say that one is fully in control, simply because it is

easy to fail to notice something. The inspections are too seldom to say that it is always up to the standard that it appears to be.

KappAhl is a part of BCI who help educate farmers in how to minimize the use of water, chemicals, and pesticides in order to create a more environmentally friendly way of farming chemically. The goal is a better quality product that does not need to be certified from a third part, since BCI is a sufficient quality trademark. The goal is to have 10 percent of the garments environmentally labeled, but they have yet to set a new goal for the BCI-cotton.

The concept of CSR is a lot newer than the environmental focus and the Code of Conduct of the company. KappAhl has been ISO certified since 1999, when they were the first company in the world within the clothing industry to receive it. Other than the ISO certification KappAhl does not follow any other standards, expect to the rules and laws of the countries where they operate.

Kindgren points out that there is a lot of focus on internal and external ethics that help to company in many decision-making processes. However, she, and everyone else she knows that work with CSR on a daily basis, feels that the top-management does not put enough emphasis on sustainability issues. In general she feels that the cooperation amongst competitors has increased, something very positive, because everyone in within the same industry aim towards similar goals within the area of sustainability.

Over all Kindgren is has a very positive outlook on the future, since the development has gone so quickly the last few years and everything is becoming more transparent. She feels that she could never alone have accomplished the changes and have overcome all the problems that they have done together.

The biggest hesitation that most companies have when contemplating whether to implement a CSR policy or a Code of Conduct is the cost of a new program and the fear that it will be a lost investment without any return. Kindgren never thought of this as a problem, she thought of it as a necessity, and today KappAhl is one of Sweden's leading manufacturers of garments containing organic cotton.

The vision for KappAhl is that the brand 'KappAhl' itself will be associated with quality, socially fair, and environmentally considerate clothing and that no further certifications will be necessary.

Beneath is the model of the cotton supply chain shown in the theoretical part showing KappAhl's supply chain in red. Please not that this it the part of the supply chain that they have decided to control from an environmental sustainability point of view.
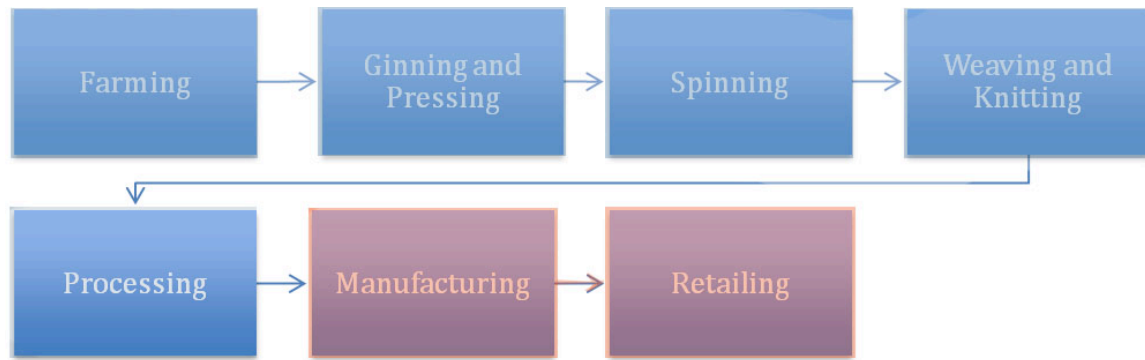
Source: BCI section 2D Supply Chain Dec 2009, Figure 1

4.2. Nudie Jeans

At Nudie Jeans, our middle sized company in this research study (beneath referred to as 'Nudie'), we met with Sandya Lang, head of CSR. This is a summary of our interview with her.

When it comes to controlling the supply chain Nudie's control starts with the fabric suppliers. Which, referring to our model over the manufacturing process, means that Nudie at this point refrains from trying to control the farming-, the ginning and pressing-, the spinning-, the weaving and knitting- and to some extent the processing stage, where the cloth is being manufactured. Nudie works with very few suppliers, three to five suppliers in Europe each season, with cotton originating in Turkey and India, and one supplier of fabric in India, with cotton originating in India. People from the purchasing department, and design and product development department meet with the suppliers and decide which fabrics to buy, although they have strict orders to buy fabrics made of certified cotton, i.e. organically grown cotton.

To secure that the cotton used in fabrics sold to Nudie is grown organically, they place certain demands on the suppliers based on international standards. The standards that Nudie use are GOTS, and Textile Exchange's recommendations (read more about GOTS, and Textile Exchange under 'Environmental Standards and Communities'). For Nudie, the most important part of a relationship to a supplier is the trust that is built during a long-term relationship with a specific supplier. This trust is essential, since Nudie can never be certain of that the entire process of cotton, from the field through ginning to spinning, is 100 percent organically made, and must therefore believe the supplier's word as well as the GOTS certification the supplier provides.

Some washes and dying of the fabrics, however, cannot be certified with GOTS organic label, due to the GOTS criteria for chemicals or dyes etc. However, Nudie claims that they always try to find the most environmentally friendly solution. Nudie's entire vision and strategy is pervaded with sustainability, which means that even the top-management considers the environmental aspect in every decision they make.

Out of the over 1 million garments that Nudie produces each year, only 5-10 percent do not contain any cotton (e.g. leather wallets and belts). Further, 80 percent of the clothes are jeans and 20 percent are T-shirts, belts and shirts, where the belts and jeans are made in Italy, the shirts in Turkey and the T-shirts in Portugal and India. 60 percent of the finished clothes are then shipped to Sweden to the warehouse in Borås for further distribution, and 40 percent is shipped from the factory directly to other markets. Transports are a weakness in the supply chain from a sustainability point of view. Even though train transports 87 percent of the goods transported from the factories to Sweden, some goods are still transported by air, and ultimately almost all clothes are locally distributed by truck.

Nudie has an agent on site in Italy with whom they have worked with for 10 years. The agent guarantees that the sustainability demands are met, and oversees the production process regularly. In addition to this, representatives from Nudie regularly visit the suppliers and factories in both Italy and India.

An important issue when addressing the sustainability of the supply chain is trust and reliability of the suppliers. Nudie has used the same suppliers of fabrics and factories where the clothes are made in Europe since the foundation of the company 10 years ago. The relationship with the supplier in India is relatively new, however, they have now supplied Nudie with fabrics for about half a year.

Nudie places quite large orders from their suppliers and they can therefore demand more and put more pressure on the suppliers, which is very positive when wanting to use organic cotton. Another advantage they have within the control aspect of the supply chain is geography, since most suppliers are located in Europe.

Nudie do not think it is possible to obtain complete control over a sustainable supply chain, without owning every step of it, and even then it very difficult. There are too many weak links, with everything from transport to the lack of control over factories, fields, and suppliers. The goal for Nudie is to work with 100 percent organically produced products. They also aim towards being able to guarantee sustainability from the textile suppliers to the finished garment and work with international standards when it comes to the part of the chain prior to the fabric suppliers, i.e. the cotton producers, the ginners and spinners. In India they feel that they possess knowledge and awareness of the spinning and washing/dying process since it is performed by the same supplier and in the same factory where the fabric is being produced. They can therefore have more specific requests and put more pressure on the supplier towards using more environmentally friendly dyes and

washes. Italy can be considered to be a weak link in Nudie's sustainable supply chain, since the spinning and washing/dying is performed in Turkey, before the textile reaches the factories in Italy.

Beneath is the model of the cotton supply chain shown in the theoretical part showing Nudie Jeans' supply chain in red. Please not that this it the part of the supply chain that they have decided to control from an environmental sustainability point of view. Also note that the arrow from processing to manufacturing is red. This is to point out that even though Nudie is not a part of the processing stage, they are looking for the most environmentally friendly wash, or non-chlorine bleaching when deciding which fabric to use in their garments.
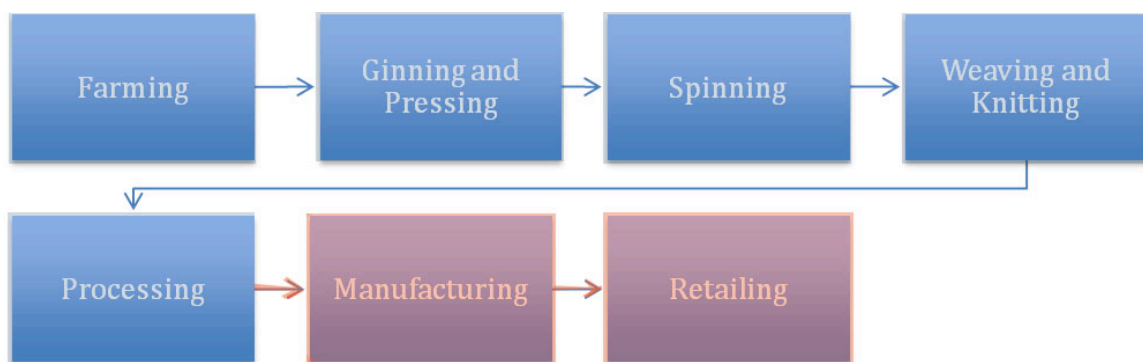
Source: BCI section 2D Supply Chain Dec 2009, Figure 1

4.3. The Ecocotton Company

Marcus Bergman, CEO at The Ecocotton Company (beneath referred to as Ecocotton Co) in Borås, confirms that sustainability within supply chains is a hot topic within the textile industry today.

Ecocotton Co looks at CSR from a different perspective and has a unique approach to sustainability, compared to its peers in the textile industry. Bergman identifies Ecocotton Co as a CSR company that has gone into textile production; as opposed to the peers who are textile and clothing companies who have adopted the CSR approach very recently, often as a result of market demand. This raises the question of which companies have a real honest CSR commitment, and which companies use it as window dressing, and follow a market trend.

The 390 independent farmers that work for Ecocotton Co in Peru are contracted to work solely with them and follow strict procedures of growing organic cotton. When the cotton in harvested it is sent to the ginners where it gets cleaned. Each bale is then weighed and marked with origin from each field and then sent to the spinners. Ecocotton Co uses one spinner only, in Peru, where they rent their own 'spinning street', i.e. one line where only The Ecocotton Co's cotton is processed.

Ecocotton customers have a choice of three different products to buy: ecologically grown cotton yarn (to be used in further production), cotton fabric, or ready-made garments that have been ordered for retail selling. After the spinning, Ecocotton Co offers their clients who desire yarn two different choices, depending on what end-product they desire, which is often a designer driven decision; cotton yarn for weaving or cotton yarn for knitting.

The weaving factories are where the finished cloth is being manufactured, and Ecocotton uses 12 certified production sites in Peru. The main supplier amongst them is the same company that Ecocotton uses for spinning. In these factories the GOTS certification is used to ensure the sustainability level. After the organically grown cotton on the 'Bergman fields' is produced into yarn, fabric or ready-made garments, 80 percent is sold in Peru or transported further to North America, and only a very small part reaches Europe.

Even though Ecocotton Co guarantees sustainability throughout the cotton supply chain, there is always a risk of contamination of the cotton, which Bergman points out. Since many people at different locations handle the raw material in the process, the risk of foreign material entering the process is always present. How, where and by whom the material is being handled during the process is of the essence, according to Bergman.

Being a Peruvian company, Ecocotton Co always has people on site locally, who continuously control the quality of production or check that the sustainability level is maintained. Their supply chain is relatively uncomplicated and far less complex than in a large corporation with numerous suppliers. Nevertheless, no matter how small or non-complex, it is impossible to guarantee 100 percent sustainability in every corner of the supply chain, according to Bergman.

Another threat to sustainability in the supply chain is the sub suppliers. In Ecocotton Co's case, very few suppliers in total are used, often as few as 1 or 2, but the sustainability can nevertheless never be completely guaranteed. There are always details on a ready-wear garment coming from sub suppliers, such as thread, labels, buttons, zippers. This means having more people involved in the process, and thus increased the operational risk and risk of human error, intentional or unintentional.

Bergman stresses the importance of transparency within the textile industry, in order to obtain a higher level of sustainability in the supply chains. Different actors need to cooperate, share information and educate both within their respective organizations, but also in-between companies. Bergman goes as far as saying that the definition of a modern company in his mind is a transparent company. Today though there is very little demand for bilateral communication in the industry.

Sweden has some of the leading companies in establishing CSR policies and communicating between themselves about environmental hazards. However, from an international point of view is Sweden a small country and consumer market, maybe too small to have a substantial impact. Even so, it is important to drive

change, because even a small company can be an inspiration to bigger companies. This is something that Ecocotton Co proves is true, since they are often invited by external parties in the industry to talk about organic cotton and sustainable production.

Another threat to the CSR work in the industry, as Bergman sees it is that there in some cases is a tendency of working towards green washing, rather than true sustainability. The commitment from management is important in setting the standard. CSR has also developed into an industry of its own, in that there are a lot of consultants making a living based on writing policies and assisting companies in setting up their sustainability work and use of standards, it has become a business idea, rather than a natural part of the company policy.

Concerning environmental sustainability and quality of the products, Bergman thinks that, although focus has been on the purchasing departments of the companies, and separate CSR departments, where they exists, and maybe considered an organizational question or management issue, more focus has to be made on the designers and design departments of the companies, where the ideas are created and garments are being formed and trends are being followed and the carried out. The designers have the real power to change the industry and tends.

It is easy to make a bad product from good high quality crude cotton, but impossible to make a good quality product out of low quality crude cotton. A product that does not meet up to the standards, including sustainability, has to be considered a bad, low quality product, even though high quality crude cotton has been used. Bergman thinks it is important to ask yourself what kind of product you want to produce or make.

Beneath is the model of the cotton supply chain shown in the theoretical part showing The Ecocotton Co's supply chain in red. It is however important to know that because The Ecocotton Co not only manufactures garments, but also sells yarn and plain textile, they really have two alternative supply chains to the one shown beneath; one which ends at the spinning stage and one ending at the weaving and knitting stage.
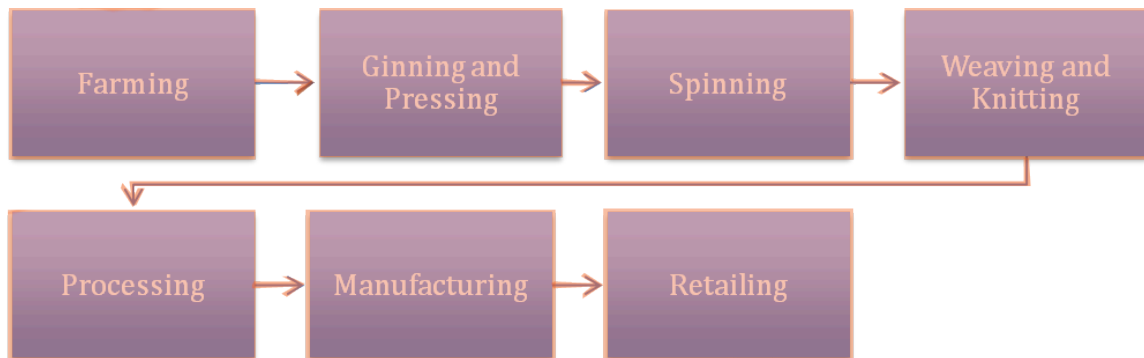
Source: BCI section 2D Supply Chain Dec 2009, Figure 1

4.2. Results

In this part we intend to describe our empirical findings based on our theories in the theoretical section of this study. Our goal is to pinpoint the main problematic areas within the issue of control of a sustainable supply chain, which we than will analyze more closely.

4.2.1. Top-Management Commitment

4.2.1.1. KappAhl

In order to obtain a successful CSR policy and attempt to reach goals of complete sustainability, it is vital that there is a commitment from top-management. A strategic issue of this kind requires the attention and commitment from the top-management (Cetinkaya et al. 2011). One might however argue that obtaining this in a larger company with many different products is a lot harder than within a smaller company not producing a variety of different products.

According to KappAhl's CEO sustainability is a very important issue that characterizes KappAhl as a company. However, Kindgren feels that the top-management should be more involved in the questions regarding CSR. It is arguable, though, that since KappAhl has such a wide range of garments the average involvement might not be enough, especially not if the company has to generate profit as well.

Since KappAhl is a 'fast fashion' company they are very dependent on fashion trends and they are very perceptive to the consumer demands. Petulla (1987) and Zsidisin (2001) claims that the effectiveness of environmental management within an industry mostly depends on outside pressure, and since the market now demands more organic garments, KappAhl does not want to lose their customers to other 'fast fashion dragons' and thereby oblige.

4.2.1.2. Nudie Jeans

At Nudie, the entire corporation is permeated with their focus on sustainability; they claim it to be an issue of equal importance as the financial aspects. With this kind of engagement from the top-management it is a lot easier to put emphasis on the sustainability challenges. Our impression is that there is a genuine interest from Nudie´s top management participants to work with environmental issues, and that there is a commitment to constantly improve sustainability. They have in fact, even though they are a relatively small company, decided to employ a CSR responsible, who work solely with these issues and participate in top-management meetings. They have also looked over their entire supply chain aiming to ensure sustainability, at least from the manufacturing stage in Italy directly, and indirectly down to the farming stage, via standards and working with fair trade organizations.

4.2.1.3. The Ecocotton Company

Bergman sees that they look upon CSR from a different perspective than other companies. Instead of being a company that has adapted CSR policies, Ecocotton Co consider themselves a CSR company who has gone into textile production. From

this, one can see that Ecocotton Co is serious about their commitment to CSR and environmental sustainability.

Burt et al., 2003; Hall and Braithwait, 2001; Bailey et al., 1998; Preuss, 2005, all see a change in how companies look upon and manage their supply chains. This change is leading towards a new outlook on the supply chain as being a proactive, strategic component, fully integrated into the competitive strategy of the company. This is the view that Bergman family have had on Ecocotton Co since the start in 1986, and it can thereby be argued that more companies should look at Ecocotton Co for inspiration.

4.2.2. Size of the Company

4.2.2.1. KappAhl
KappAhl has some advantages being a large company. Kindgren points out that it is both beneficial for them as a company, since they can put pressure on their suppliers and make demands towards a more sustainable production. However, she claims that it is also beneficial for the market, since she feels that it is the large 'dragons' of the market are the ones that can drive change throughout the entire industry.

Hall (2006) and Perl and Vorbach (2009) adds that large companies usually have more pressure from the public to spend their profits on environmental issues, since they make more profit than smaller companies. This also leads to increased investments, which thus implies that smaller companies, due to the lack of outside pressure, would not have the same incitement to improve their sustainability efforts. This can be noticed in KappAhl's involvement, since they, according to Kindgren, feel the demand for organic products, especially from new mums.

4.2.2.2. Nudie Jeans
Even though Nudie is quite a small company, Lang feels that they still can make demands since they order large purchasing volumes at the supplier. Although, at the same time they are small enough to easily make internal changes and implement these throughout the supply chain.

4.2.2.3. The Ecocotton Company
Our smallest company, Ecocotton Co goes against the theory through showing that a small company can attain the initiative to improve sustainability without the pressure from external parties. However, since Ecocotton Co in fact is a Peruvian company and they by being located where their cotton is grown, they have in-house representatives on location at all time.

4.2.3. Geography, Length of the Supply Chain, and Stakeholders

4.2.3.1. KappAhl
The geographical spread of KappAhl's supplier is a concern when it comes to the control of the supply chain. The rules and regulations in Asia are very different from ours here in northern Europe, which can create difficulties when manufacturing,

because not all chemicals, for example, that are legal in Asia are legal in Europe. Crossing boarders can therefore become a problem if these regulations are not followed properly. However, since KappAhl have offices at every supplier location this lack of control may be averted.

Another issue is that depending on where in the world one is operating, the environmental problems have different priority on the agenda. Kogg (2009) defines environmental concerns as a 'luxury problem' that mainly arises in the areas of the world where people can afford to think about it.

4.2.3.2. Nudie Jeans
Geographically speaking Nudie's supply chain is quite short, since they mainly operate in Europe, with approximately 90 percent of their garments made in Italy, Turkey, and Portugal. The supplier in India manufactures the rest. The shorter the supply chain, the easier it is to keep everything under control, partly because there are fewer areas to control, and mainly because the communication usually runs smoother; there is less room for errors.

4.2.3.3. The Ecocotton Company
Ecocotton Co have a very limited geographical spread of its supply chain, since everything is grown, treated, and manufactured in Peru, which probably makes Ecocotton Co supply chain one of the least complex cotton supply chains there is. Before Stephen Bergman got to Peru in the 1980's no one was farming cotton organically, but this is something that he implemented because he saw the demand for it elsewhere in the world. He made the environmental issues that he thought was missing in the cotton industry and made the farmers in Peru prioritize it equally high on the agenda.

Ecocotton Co has great relationships with their stakeholders, since they work closely with most of them. They have limited their suppliers in order to maintain this close relationship

Ecocotton Co realized in the 1980's that one of their supplying spinning mills also owned and operated a ginning mill. This kind of cooperation and efficiency shortens the supply chain further and brings the steps of the chain even closer together.

3.2.4. Adaptability and Ability to Change

3.2.4.1. KappAhl
KappAhl, being our largest company probably has the largest pressure from the public and mass media, thus have the greatest need to be adaptable to market changes. Especially in the fast-fashion industry companies need to be perceptive to fashion trends, consumer demands on organic, or more environmentally friendly produce, but at the same time not lose focus on quality and design.

However, the downside to being a large company is that it is more difficult to adapt to these changes. This is simply because more people are involved and there are more steps to go through and more stakeholders to take into account in order to implement the changes thoroughly.

3.2.4.2. Nudie Jeans

Nudie has a smaller range of clothes for consumers to choose from than KappAhl, but sine they are in a higher price class, the consumers might expect more. Nudie's market is more stable then the one of a fast-fashion company, but being a rather small company with few suppliers and other stakeholders, Nudie has the ability to implement changes more easily.

3.2.4.3. The Ecocotton Company

The smallest of our companies, Ecocotton Co, has the fewest products, suppliers, and stakeholders, thus they are the most adaptable. However, they do not focus on trends and changes within the market the same way as KappAhl and Nudie do, since their focus is on CSR, rather than on textile, as Bergman suggested in the interview. Consequently, Ecocotton Co are the most adaptable and have the best ability to change of the three companies, but they do not listen to market trends and have therefore not the same need to be adaptable as the other two companies do.

4.2.5. Communication and Information Flow

4.2.5.1. KappAhl

KappAhl's supply chain starts at the manufacturing stage, thus this is where the information flow starts. Before that, they possess little awareness of the origin of the different parts within the garments. However, of the part that they do control, KappAhl seem to have a fairly good information flow. Good communication is easier when the different parties are using the same language (Kogg, 2009), and because of KappAhl's offices in each land they operate, with a Swedish boss who knows that Swedish culture well, they seem to handle this well.

The eco-economic tradeoff for KappAhl must be of constant consideration for KappAhl, since their consumers want garments in the lower price segment, although many of them are developing an increasingly environmentally concern.

Through their CSR report, KappAhl tries to communicate their environmental efforts openly to their stakeholders, what they are working on as well as their future environmental efforts and goals. Kindgren specifically points out her personal point of view of the importance of openness and transparency within supply chains in the textile industry in order for it to become more sustainable.

4.2.5.2. Nudie Jeans

A very important aspect of the information flow is when the relationships between the suppliers and the producers are valued. This is something that Nudie treasures highly. Their long-term relationships with their suppliers have created a trust,

which in turn brings an open communication. The agent located in Italy is another component that makes it the internal communication easier.

When looking at the eco-economic tradeoff, Nudie has taken a stand in being the higher price segment and instead profiling the company as loving both jeans (which is their main product) and the environment.

4.2.5.3. The Ecocotton Company
Since Ecocotton Co is a small Peruvian company operating fully within Peru, the information flow is constant and easily approached. The entire supply chain is within Peru, thus there are neither borders to cross nor any differences in rules and regulations. This makes the communication a lot easier.

4.2.6. Cooperation and Trust

4.2.6.1. KappAhl
Over all KappAhl operates internally and follows, except for the ISO certification, merely the rules and regulations of the countries they operate in. Instead they set their own goals and standards. In the past they have felt that when they outsource inspections these became too infrequent and the quality did not compare to the quality of their own inspections, they therefore decided to take charge of the inspections within the corporation instead.

Kogg (2009) explains that when working together with other companies or organizations one can impact the whole industry and raise the bar for a more environmental supply chain. This, however, do KappAhl already feel that they are being a part of. Even though the 'fast fashion dragons' do not formally work together, they communicate and set the same demands on suppliers, and Kindgren believes that they help set a higher standard, even without an official cooperation.

4.2.6.2. Nudie Jeans
Even though Nudie is not as large as KappAhl they feel like they are big amongst their suppliers and therefore can set demands and requirements on the cotton and the handling of the textiles. Over all Nudie seemed to have very good relationships with their suppliers. Lang pointed several times that the connections with their suppliers were all long-term, many of which they have worked with for ten years already, and that the foundations of the relationships all are built on trust.

4.2.6.3. The Ecocotton Company
The Ecocotton Co does not cooperate with any other companies, since they are quite unique in their way of production. Their cooperation is instead focused on the suppliers to whom they have a very close relationship with. When working alone, as The Ecocotton Co have chosen to do, one has an increased flexibility of how to operate, but on the down side it does not influence as many people and even though the industry looks at The Ecocotton Co with interest, it does not have the willingness to change quite yet.

4.2.7. Within Company Control or Not

4.2.7.1. KappAhl
KappAhl have limited their supply chain to the manufacturing stage and onwards and thereby feel that they possess an acceptable level of control over this specific part. They work continuously with as many as 250 suppliers each season, which they are responsible for during that period of time, and it would be next to impossible to have control over all the sub-suppliers as well.

When environmental demand spills over from one industry to another a multiplying effect is created, and new standards, and even new rules and regulations can be developed. (Kovacs, 2008) KappAhl do not follow any specific standards and have no official cooperation with external organizations, but they feel that they make a change within the industry through setting high demands and thus, through this multiplying effect, creating new standards along with the other 'fast fashion dragons'.

Another external factor that KappAhl encounter frequently is stakeholder and consumer demand, which they need to work with continuously in order to make their business attractive and effective.

4.2.7.2. Nudie Jeans
Nudie goes one step further; they do not just focus on the manufacturing stage, but also wants to be a part of the textile choices. They therefore take responsibility for the washes and dyes that are used when treating the cotton fabric towards their wished appearance. However, the zippers, threads, and buttons that are used when making a pair of jeans are bought from sub-suppliers, and falls therefore outside the direct hierarchical control of the company.

4.2.7.3. The Ecocotton Company
Compared to the other two companies, Ecocotton Co go all way and want to have as much control as possible over the entire supply chain. Therefore, everything, except for a few details within the ready-wear garments, is directly under Ecocotton Co control. Like any other company, Ecocotton Co must of course consider the stakeholders and the consumers, but unlike many companies they are in such a niche that the stakeholders and consumers already know what to expect.

5. Discussion and Analysis
In this chapter we will look at our findings from an analytical point of view to see whether there is a coherency between our theory and our empirical studies.

5.1. Interpretation and Discussion

The best solution in order to minimize environmental impact within the supply chain is to minimize the number of processing steps and within these steps choose a cleaner production technique. With fewer steps come greater control and fewer stakeholders with different incitements. Also, in order to make the supply chain less complex, it is vital to minimize the number of different fabrics and details, i.e. minimize the number of sub-suppliers.

The countries in the western parts of the world carry a responsibility, since we often represent the buyers, the distributors and the large corporations that make the profit. It is the western world who can afford to focus on environmental problems, and since this is vital for the entire world, we are the ones who can make a difference through make demands of more environmentally sound efforts.

Further, everything is connected; it is called a supply *chain* for a reason. By making environmental issues an essential issue for the buying company, this will reach out through the chain and through communication and cooperation an understanding of the different parts of the chain will be created. This will lead to greater knowledge, but also greater trust. In the end, the ultimate supply chain should not need control, but everything should instead be built on a mutual cooperation and trust from all parties involved.

5.2. Analysis

That sustainability is a hot topic within the textile industry today is confirmed by all three of our companies: KappAhl, Nudie, and Ecocotton Co. Nudie and KappAhl both have invested in separate CSR policies for the companies, and they have even employed a person solely responsible for CSR issues within the organization. Ecocotton Co, on the other hand, define themselves as a CSR company that has gone into textile production, as opposed to their peers who are textile and clothing companies that recently adopted the CSR approach. Ecocotton Co's vision, as well as every policy within the company, is created with sustainability in mind.

The most recent trend concerning supply chains, which we can identify within our companies' outlook as well, is looking at them as proactive, strategic components, integrated into the company strategy. The aim is to create long-term relationships with suppliers and stakeholders and viewing them as partners instead of suppliers. (Burt et al., 2003; Hall and Braithwait, 2001; Bailey et al., 1998; Preuss, 2005) The industry seems to have started noticing the interdependency of the supplier-buyer relationship; that the buyer is nothing without its commodities, and the supplier is nothing without the orders from a buyer. Kappahl, Nudie and Ecocotton Co all confirm the advantage of long-term relationships. They have all experienced first hand how having a sold supplier-buyer relationship makes it easier to work together, and implement environmental programs.

All of our three companies agree with Lee (2004), that it is critical that the environmental issues are on the corporate agenda, in order to obtain environmental sustainability. Lang, from Nudie, and Bergman, from Ecocotton Co, both feel that the environmental issues are at the top management agenda and that the issues are treated and prioritized accordingly. Kindgren from Kappahl, however, thinks that from her personal point of view, the environmental sustainability should be higher up on the corporate agenda.

However, one company's ideas differed from the other two. Bergman at Ecocotton Co thought that even though it is important that the top-management are committed to the sustainable engagement, they are not the ones who can actively change the garments. He claimed that an essential issue when increasing the number of organic garments on the market is for designers to ask for organic fabrics. It is the designers that can make the real demands for a company. Research shows however that it is in fact the purchasing professionals, and not the designers, who have to consider the entire life-cycle and supply chain of products and their impact on the environment (Carter and Carter, 1998; Carter et al., 1998; Klassen, 1993; Zidisin, 2001).

Sustainability can be considered a strategic issue and should thus be incorporated in the corporate policy and strategy in the form of guiding principles and visions in order to obtain environmental sustainability. (Cetinkaya et al., 2011) We feel however that this might not be enough, since all three interviewed companies have a CSR policy and a clear vision, but still have long way to go before they can call themselves environmentally sustainable. Ecocotton Co is closest to their goal, and environmental sustainability is incorporated in every step of their production process and perhaps higher up on their corporate agenda than profitability, but they still do not consider themselves 100 percent sustainable.

Public companies that are listed on the stock market, like KappAhl, could be under bigger pressure when it comes to delivering a financial result, satisfying the shareholders and the media. It might for this reason be unavoidable that financial issues take precedence over environmental issues on the top management agenda. Somehow they have to decide what has priority towards the public, delivering a strong result or reputation and environmental responsibility and coming across as responsible and committed to other values than financial ones.

Petulla (1987) and Zsidisin (2001) point out that the effectiveness of environmental management within an industry mostly depends on outside pressure, something we think is true. Our research shows that different kinds of outside pressure have a hierarchy of importance, where maybe survival of the company, i.e. financial success, is the strongest driver. The bigger the company, the more people involved, which leads to increased internal and external pressure from the employees, the shareholders, the public, the government, the media, etc.

Hall (2005) and Perl and Vorbach (2009) claim that larger, profitable companies are more exposed to pressure from the public to improve their control functions and increase environmental performance. We agree that large, profitable companies to a

larger extent are under the scrutiny from the mass media and perhaps should be so. They have, as KappAhl confirmed, the means and power to influence other actors in the industry and perhaps also a responsibility to set a good example trying to improve environmental sustainability within the textile industry as a whole. Hsu (2005) stresses the fact that powerful companies within the supply chains can affect others and help establishing guidelines and guide others to a common goal.

Kindgren at KappAhl explained how they work together with a number of large Swedish as well as international companies within the clothing industry to try and reach a higher level of environmental sustainability at production sites and other stages in the supply chain. Larger companies have more power to drive change and affect both suppliers and the industry as a whole. Forman and Jensen (2004) and Perl and Vorbach (2009) argue that it takes one strong company to facilitate the demand for change. This company could for example be part of your supply chain, or it could be another company within the industry.

The more important you are for the suppliers, i.e. financially important, the more likely you are to successfully place demands on environmentally friendly production. On the other hand, smaller companies are easier to control and maybe quicker to adapt and obtain a higher level of sustainability, due to a shorter and less complex supply chain. Kappahl, Nudie and Ecocotton Co are all internationally known and their brands stand for different levels of sustainability, even though all three work on profiling themselves as sustainable. Regardless of size, it is our interpretation that you can be a role model, even though large companies are more likely to set trends that will be followed by peers in the industry.

Forman and Jorgensen (2004) and Perl and Vorbach (2009) think it is vital for small companies to form mutual partnerships, based on cooperation and dialogue, in order to drive change towards a more environmental friendly process throughout the supply chain. On the other hand, it can be arguable that this is even more important for larger companies. For example, they can usually make demands on how the production should be performed, due to the size of their orders, and when a many companies cooperate and make the same demands, this can become the standard rather tan the exception. However, large companies are, as small companies, dependent on that the suppliers want to work with them and that they are able to meet delivery deadlines, since failure to deliver could result in devastating financial results.

Although, when looking at Ecocotton Co, which is considered a small company, one can start questioning the theory that Forman and Jorgensen (2004) and Perl and Vorbach (2009) present. Even though Ecocotton Co is small, they have not been dependent on cooperation and dialogue with peers in order to drive change, according to Bergman. They are an example of a small company who has driven change within the industry from the start, and who is invited by large corporations to discuss environmental issues in the cotton supply chain.

From our empirical study we have come to the conclusion that it is important to look at company size from two different angles. On one hand, what the theories we have read are right; it is easier for a larger company to drive change, especially if this company is cooperation with other large companies. However, Ecocotton Co has cshown us that size is not everything. On the other hand, we have discovered that in the clothing industry it is not necessarily the size of the company that decides what level of control over environmental sustainability the company will obtain over its supply chain, but rather the variety of products.

The complexity of the supply chain is mainly dependant on how many supplier, sub-suppliers, and other stakeholders there are to take into account. When considering this, a large company what only makes sheets, for example, probably has a distinguishingly less complex supply chain than a small underwear company, bearing in mind that one style of a bra might consist of approximately 40 different pieces. This means that you may require approximately 40 different suppliers and sub suppliers to manufacture that product alone. When adding sustainability to this equation it is important to emphasize all the sub-suppliers that might be outside of the buying company's control, which would give us a less environmentally friendly supply chain. Consequently, the number of components within a product is essential when discussing the complexity of a sustainable supply chain within the clothing industry.

Cetinkaya et al. (2011), talks about best practice companies and their ability to deal with trends and changes faster than their competitors and Lee (2004) agrees that agile companies adapt over time according to new market structures and strategies and that such companies react speedily to sudden changes in supply and demand. There is an increasing demand from consumers to consider, amongst the stakeholders in a supply chain (Mentzer et al., 2001; Brito et al., 2008). The drive for working with sustainability and environmental issues in the supply chains differ between companies, also between the three companies we interviewed.

We feel that all three have a genuine interest in working with sustainability in the supply chain, but there is however a difference in how much they are driven by consumer demands. KappAhl has the biggest pressure to adapt to trends because of the collection that they carry as a result of their niche as a 'fast fashion' company. It might be fair to say that Nudie is less exposed to trends and changes in fashion, other than difference in cut for their jeans, since jeans and t-shirts are very classic pieces. Ecocotton Co is even less driven by consumer trends and preferences, since they aim to attract a certain niche of the market. Consumers using Ecocotton Co's products, we felt, to a bigger extent are actively looking for an ecological alternative, and are very aware of what brand and manufacturer they choose.

Ecocotton Co also varies from Kappahl and Nudie in the sence that they provide a variety of textile products, such as bed sheets and linens, yarn, textile fabrics, as well as ready-made garments, which makes them less vulnerable to consumer trends and short-term market changes. A best practice company is difficult to define, but concerning environmental sustainability in a cotton supply chain, we feel that

Ecocotton Co is the best example of a best practice company. They are, according to themselves, also 'trendsetters' within the textile and clothing industry and are often asked to participate as a best practice company when discussing sustainability in the cotton supply chain.

Kogg (2009) stresses the fact that the company's approach to sustainability, and in this case environmental sustainability, is vital to the end-result, i.e. what level of sustainability the company will obtain. In the cases of KappAhl and Nudie we think it is fair to say that they are both focused on ensuring acceptable levels of environmental sustainability in their supply chain. They both guarantee certain levels of sustainability from the manufacturing stage (see model on p. 32 and 34) and prior to that stage they rely on a number of international standards.

Ecocotton Co however, guarantees sustainability to an impressive extent on all stages throughout the cotton supply chain (see model p. 36), from the farming and cotton fields in Peru to the ready-wear garments. They also sell the product at an earlier stage in the manufacturing process, such as yarn and knitted or woven fabric, to other companies for further development and processing. When looking at the life cycle of a product, it ends when the product is thrown away or recycled by the end-consumer (although this thesis is limited to the product reaching the store). It is therefore debatable whether Ecocotton Co's responsibility over the environmental sustainability ends when they sell their product onwards for further processing, or if they still have some responsibility for it until it is thrown away by the end-consumer.

Each company has a choice whether to address environmental challenges alone or in collaboration with other companies. KappAhl, Nudie and Ecocotton Co all engage in different kinds of cooperation and projects with other companies, preferably Swedish companies, in order to reach a higher level of environmental sustainability in their manufacturing process and supply chain. KappAhl told us that they regularly meet with a group of peers to discuss how to move forward and address the environmental issues throughout the supply chain. Ecocotton Co often participates in seminars, trade fairs and forums in Sweden, as well as international seminars now and then, to explain their unique manufacturing process.

Based on our research we can see that Swedish companies are very environmentally aware, and that they feel they are the ones who in many ways drive change and take initiatives to obtain new levels of sustainability for the suppliers. Working together might impact the whole industry and help raise the bar for more environmental processes in the supply chain (Kogg 2009).

Ellram (1998) and Zsidisin (2001) point out that it is necessary to work together with local governments, suppliers, customers and competitors and build strong relationships with different stakeholders in the supply chain to address problems concerning environmental issues and successfully improve the levels of sustainability. We have through our research seen that cooperation makes controlling the supply chain easier, and that all three companies encourage

cooperation and openness within the supply chain in order to make it more sustainable. Zsidisin (2001) continues with saying that it is important to involve all trading partners to obtain true sustainability.

An obstacle could emerge if there is shown to be little interest from the different stakeholders to participate. Working together might to the outside world seem obvious, but neighboring countries could for example compete over qualified workforce, attracting business to their region, and thereby accepting fewer rules and regulations. The producing countries might not necessarily have much choice when deciding whom to supply to. Companies globally compete over end-consumers and they therefore wish to work with the best, most reliable suppliers in order to receive a satisfying deliverance of their goods.

When aiming for complete sustainability within a supply chain it is important to involve every member of the chain, which are in direct link to the buyer. There is a great possibility that one link within the supply chain is weaker, i.e. less dedicated to reduce harmful environmental effects, which results in that the effort of another part in the chain is mitigated. (Walton et al., 1998; Zsidisin, 2001) However, to obtain the same commitment from all members of the supply chain is a difficult job. Some might argue that efforts to improve sustainability in a few stages of production or in different parts of the supply chain helps raise the total level of environmental sustainability in a company's cotton supply chain, and that is a step in the right direction.

It is logical for stakeholders to concentrate on their own part of the supply chain, rather than the chain as a whole. Further, the same logic can be applied to exporters' focus on production whereas importers tend to focus more on consumer preferences and needs. (Haugland and Grönhaug, 1988; Korneliussen and Grönhaug, 2003; Solér et al., 2010) This is a problem for sustainability since it often result in diminished interest in working together towards a common goal concerning the environmental standards and sustainability level of the supply chain.

This problem may be averted if every member carefully monitors its own part of the chain and make sure that sustainable measures are being taken, a high level of total sustainability can be reached anyway. Although if this kind of system is utilized, changes will more certainly be more difficult to implement, therefore it is not to recommend.

KappAhl and Nudie could be accused of focusing more on the consumer preferences and sales, since they are directly involved in guaranteeing sustainability rather late in the cotton supply chain, at the manufacturing stage, which could imply that there are stronger drives than the true environmental issues behind the commitment, such as focus on financial incitements, social issues, image/mass media, and customer preferences. Before reaching the manufacturing stage of the supply chain they solely rely on international standards.

Ecocotton Co, however, also rely on GOTS as a standard, but this is simply as a proof of the sustainability that they provide. Their focus is towards the early stages of the cotton supply chain, at the farming stage and the early parts of the process, ginning, spinning, and not primarily on the consumer preferences. They take pride in being one of the leading producers in the world of organically grown cotton, and they also question the motives of other companies in the business that label themselves as 'organic'.

It is commonly said that through globalization the world is shrinking. This is true for supply chains too, since they are becoming more international and expansive, and companies rely on an increasing numbers of suppliers and sub-suppliers. (Welford, 2002; Brito et al., 2008) The level of communication and flow of information within the supply chain could help create a sustainable advantage, since the company that controls its supply chain the most effectively and accurately, ends up number one in competition with others (Solér et al., 2010).

Although this is true, one must be very careful with how the information is shared, since different people can interpret information in many different ways when looking at an international scale. The exact same information can be understood differently depending on the persons' frame of references, language, level of education, and customs.

For a company of KappAhls' size, with 250 suppliers and many more sub-suppliers and stakeholders spread out in several different countries, communication is bound to be more of a challenge than in Ecocotton Co's case. Ecocotton Co mainly deals with one country, Peru, and one continent, America, which involves mainly two languages, Spanish and English.

For many international companies different stages in the manufacturing process may take place in different countries, with other laws and regulations than the buying company is used to. This makes the control and follow-up of sustainability more challenging. In Ecocotton Co's case, however, everything is processed and manufactured in Peru, which makes the communication and information flow very easy. Since they also have representatives on site all the time, they can control the whole process locally continuously.

When looking at Nudie there are several countries involved in the process, where the first stages of the manufacturing, from the crude cotton, to ginning and spinning is done in Turkey and the textiles and actual garments are being produced in Italy and the shipped to different parts of the world. Nudie has one agent on site in Italy all the time, but other than that they need to send out representatives to both Italy and Turkey, and even though the distances are quite short, the control cannot be conducted continuously. One factor that could make the controlling easier for Nudie is that they mainly deal with Europe and European laws and regulations.

When taking this scenario one step further, we get to KappAhl's situation where a choice is made upon which supplier is best suited for the specific garments that are being manufactured. All suppliers are located in Asia and KappAhl themselves are unsure of the origin of the cotton that they use.

In KappAhl's case the suppliers are further away, the culture differs distinctively from ours and the language barriers are wider. These components all make the communication and control functions increasingly complex. Using local representatives as well as sending people from the Swedish office to control the level of sustainability and that standards are being followed a few times a year, still only gives you an instant image of what is going on at that precise moment. It does not say anything about what goes on in each little corner of the supply chain all 365 days per year. On top of that, most of KappAhl's visits are announced, which implies that certain problems can be hidden and temporary solutions can be staged. Both KappAhl and Nudie point out that they make frequent controls, but not frequent enough, and they both see this as a major problem.

The research conducted by Yu et al. (2001) and Perl and Vorbach (2009) who states that actors of a supply chain learn from each other while sharing information whilst they improve the sustainability throughout the entire supply chain. This can be looked upon on two levels. Firstly, the closer you are to the other actors of the supply chain, the better, because information flows more easily and it is less complicated to learn the other actors' points of views. Secondly, when conducting a global supply chain the buyer should not only communicate its point of view to the suppliers. Instead it is important to maintain a dialogue where the components can learn from each other, both when it comes to the areas in which they operate, but also about the culture and conducts of the respective countries. Through the latter kind of communication there is even more to gain than just a smooth flow of information.

It can however be argued that the company who most effectively manages and most accurately controls their cotton supply chain gains the most in competition with others, depending on the criteria by which the company performance is valued and measured.

If the environmental awareness of the company's customers and buyers is high, the economic outcome is affected by how well they work with environmental sustainability and are able to be perceived as an environmentally aware company. If their consumers are not environmentally aware the economic issues probably take precedence over the environmental issues. This dilemma is by Seuring (2004) and Solér et al. (2010) referred as the eco-economic trade-off.

Another type of eco-economic trade-off that we could find in the textile and clothing industry was the one between environmental goals and financial goals. Business partners could choose to work together and cooperate, regardless of whether they trust each other or not, if they are strongly dependent on each other's businesses, according to Andaleeb (1995). To what extent you are dependent on a certain

supplier could also effect how you value trust. This trade-off occurs earlier in the process than at the consumer or retail stage at the signing of a new supplier to be more precise.

The positive impact of information sharing and the importance of frank and open communication when building relationships and gaining trust between business partners is addressed by Andersen and Narus (1990), Andaleeb (1995) and Cheng et al. (2008). Cheng et al. connects communication with trust and inter organizational knowledge sharing when successfully working towards greener supply chains. Trust is built through open and honest communication, whilst it also leads to more honesty and openness when it comes to information sharing.

All three companies that we have interviewed stress the importance of transparency within the textile industry, in order to obtain a higher level of environmental sustainability. They truly believe that it is essential for different actors to share information and educate each other as well as their own organizations in order to obtain environmental sustainability within the cotton supply chain. Kindgren at KappAhl states that the communication between companies has increased greatly over the last years, whilst Lang at Nudie still finds competitors to be closed off and not likely to chare information about their suppliers etc. It is possible that we now are in the middle of a transformation; that the industry is opening up, little by little.

Due to the lack of information sharing there are still very few examples of sustainable supply chains according to Young (2000) and Perl and Vorbach (2009). Bergman at Ecocotton Co agrees to this and feels that a lot of companies in the textile industry use sustainability as window dressing and do not have a true commitment. Cooperation and information sharing can therefore still be very much improved on an international level. The transparency and the willingness to share could also be affected by to what degree the environmental sustainability is considered to be a competitive advantage by each actor of the supply chain. In the end it is simply a matter of survival for the companies, where their future and prosperity is decided by financial performance and the outcome depends on how well they compete with other companies in the industry.

Cetinkaya (2011) discusses the problems with obtaining an environmental friendly process and production within the supply chain due to a lack of standards, a lack of knowledge and regulations, and a lack of highly developed corporate social responsibility. She also points out that progression in the environmental field does not include a direct or measurable payback and that the benefits are more long-term and qualitative. Bergman at Ecocotton Co confirms all this and refers to a common lack of control in the textile industry along with the lack of rules and regulations demanding clear information about country of origin on crude cotton. All information is important, and this is something that the cotton industry yet has to catch up with.

All three of the companies we interviewed, regardless of size, number of suppliers, top management commitment, level of cooperation with other companies etc., think

it is impossible to control the supply chain to 100 percent at all times. Even if you own your own cotton field and factories, there are always operational hazards and weaknesses, threatening to contaminate the cotton or the textiles in the process. (Interview with Ecocotton Co)

Ultimately all three companies say that it comes down to trust: A company needs to be able to trust that your suppliers follow the rules and guidelines agreed upon, trust that your suppliers use sub-suppliers with the same environmental standards that you set, and trusting that participants and stakeholders within the supply chain follow standards in the stages of the chain that do not fall under your direct control. However, this is not just any trust, but a trust for a supplier who has proven to be trustworthy, and the buyer-supplier relationship almost has become a partnership.

The balance between control and trust is discussed back and forth in the literature. Hse (2005) talks about that it takes a strong purchasing company to address; control and monitor systems to ensure alignment with sustainability goals and that standards are followed. Norms, standards, codes of conducts all need to be implemented and regularly followed up. Preuss (2005) puts more emphasis on well-functioning relationships in achieving improved practices in different areas.

Anthony 1965, Green and Welsh 1988, Jaworski 1988, Lusch and Jaworski 1991 and Andaleeb 1995 all agree that control is necessary and a fundamental management activity, intended to help companies achieve goals. At the same time Andaleeb 1995, says that a high level of controlling could lead to less flexibility and that it could also imply a lack of trust from the buyer towards the suppliers. Andaleeb 1995. It could be argued that maybe the control system and also the frequency of control has to be very high and thorough in the beginning of a relationship to build trust and teach the business partners what is expected of them in terms of environmental sustainability, and if the agreements and standards, norms and guidelines are followed precisely over and over again when put to scrutiny, eventually the trust is developed that could lead to less controlling. Maybe after working together a long time and high levels of trust is developed, there is no need for controlling at all. Andaleeb (1995) opens up for that possibility, by stating that it should not be necessary to exercise extensive controls between business partners where there is a high level of trust, since trust provides assurance enough.

Further, trust is considered to be a fundamental ingredient when building a long-term relationship that fosters the business partners. (Doney and Cannon, 1997; Skandrani, 2011) KappAhl, Nudie and Ecocotton Co all strive to build long-term relationships. They all have suppliers in the chain with whom they have worked together with for more than 10 years, as well as a few they have just started a relationship with, in the case of KappAhl and Nudie. They all agree that long-term relationships are preferred. Lack of trust makes relationships fragile and unstable (Andaleeb, 1995), and since it is difficult to control the supply chain continuously, at all hours, all year around, trust is essential.

We feel, after interviewing three very different companies that when it comes to a commitment to environmental sustainability, it takes a lot of control, communication and trust in order to be able to guarantee sustainability at any level up to 100 percent. KappAhl, Nudie and Ecocotton Co have taken different steps towards guaranteeing a level sustainability, but no matter what steps have been taken, and how good the intentions are and how thorough they have been in setting up the manufacturing processes according to environmental sustainability goals, they still hesitate to guarantee sustainability, since the issue of trust of a fundament of it all.

Bergman also thinks that the demands and standard setting has to come from the western parts of the world, where the consumption mainly takes place. We have to be responsible for driving change in poor countries where education level is low and other needs take precedence over environmental problems.

Kogg (2009) also considers the environmental concerns a western problem, but further points out that these discussions mainly arise in countries where they can afford to worry about the environment; she refers to it as a luxury problem. Brito et al. (2008) and Carter and Mol (2006) say that there currently is a difference in how sustainability and corporate responsibility are viewed, between Asia and Europe, but that the awareness of environmental problems and their impact is increasing. This is in fact seen happening in the world today, with China become increasingly richer and simultaneously acting out several new green initiatives. However, we feel that the argument should not be whether we can afford to worry about the environment, rather that the question should be if we can afford not to.

6. Conclusion

Sustainability is today a hot topic in almost all industries. More and more people have started asking themselves of the origin of the products that they buy and this demand of information has started to become clear to the companies. This has lead to the focus on supply chains and control of the supply chains. In this thesis we have tried to unveil the problematic control issues within the cotton supply chain.

All three companies that we interviewed have settled on different levels of sustainability and what parts of the supply chain to control. KappAhl and Nudie Jeans Co focus their control toward the manufacturing stage, and before this stage they put their trust in the sub-suppliers hands. The Ecocotton Company, on the other hand, tries to control the entire supply chain, from cotton field to ready-wear garment. The Ecocotton Company have the most control over their supply chain, but since they have different products to offer, they guarantee sustainability to different stages of the supply chain, depending on which product they sell; ready-made garment, textiles, or yarn.

We have through research picked out a number of theories that we think are relevant to our thesis. These theories are all different factors that add to the complexity of controlling the cotton supply chain from a sustainability point of view; Management Commitment, Size of the Company, Geography, Length of the Supply Chain and Stakeholders, Adaptability and Ability to Change, Communication and Information Flow, Cooperation and Trust, and Within Company Control or not.

Maybe focus has to be changed from the purchasing department of the companies as being the key parties to deciding which stakeholders to engage and which suppliers to work with and which garments to order, to the designers, who in fact ultimately are the people deciding the trends, fabrics, styles, fashion and garments to where and how they should look and thereby also the processes involved in manufacturing, ordering and purchasing the articles.

The quality of a product could also be judged based on level of sustainability and not only the quality of the fabric used to make it. If 250 billion articles of clothing are produced each year for 4 billion people, cotton is bound to become scarcer, or at least more expensive and exclusive, as future demand will probably not be met with a world population of increased standards, and thereby increased demand. This will likely have to lead to new research in finding new materials as well as research on new processes for recycling of cotton materials and mixed materials.

The textile industry, being one of the largest in the world with about 300 million people employed worldwide, has a lot of power and control over the handling processes and manufacturing industry in many countries. This also means that people within the industry have the power to make change, and when they implement these changes, they will in fact have a significant positive affect on the environment.

All three companies say that the control and follow up concerning standards and manufacturing processes, ultimately comes down to trust. In the end there is a limit top how much you can control and to what extent you can guarantee that the level of sustainability is maintained 365 days a year, uncontaminated and unchanged.

It is not only a commitment from top-management that is required, but the approach they use is also important, because it decides which priority CSR issues take on their agenda and what signals are sent to competitors, colleagues, employees etc.

The process from the crude cotton and handling of the cotton in the fields, from picking and gathering, ginning and spinning, weaving and knitting and processing into textiles and manufactured into clothes, is a delicate process that involves a lot of people and factories at different locations and sometimes countries. This means that there is a lot of operational risk and that there are many steps where the ecological process could be intentionally or unintentionally jeopardized and the ecologically grown cotton could be contaminated.

Transparency and openness within the industry is important. Communication, information sharing, knowledge about the whole process and stakeholders knowledge about each others processes and companies and supply chains enhances the chances of good cooperation and partnerships regarding environmental issues in the supply chain and the creation and agreement on new standards and level of sustainability in the whole textile industry.

Control is diminished; the more sub-suppliers are involved in the process. Even small companies with few suppliers, whom they are in control over, lack control over the sub-suppliers, since they do not deal with them directly.

The more local you are (conduct business on site, visit regularly, have local representatives and clear routines and guidelines, and follow-ups) the more frequent you are and the closer you work with your suppliers, the more likely you are to be able to guarantee sustainability on different levels.

All three companies agree that it is impossible to obtain 100 percent control over your supply chain, and thereby it is also impossible to ever guarantee complete sustainability from an environmental point of view. However, it is important to be open about how you deal with environmental issues, and to share information within your own organization, but also with your peers within the industry in order to drive change and thus reach a higher level of sustainability in the industry as a whole.

According to KappAhl, Nudie and the Ecocotton co, it ultimately comes down to building relationships within the supply chain that are based on trust. The buying company, who puts its name on the label of the clothes they are selling need to trust its suppliers to do what is agreed regarding environmental sustainability, trust its stakeholders that standards and guidelines are followed and finally trust its employees that the operational risk is minimized.

Cooperation, partnerships, communication, information sharing, and trust are all linked together and are vital if change in a positive direction is to take place. Without good and open communication there will be no trust, information sharing or close cooperation or partnerships. At the same time, without trust there will be no open communication and information sharing.

6.1. Solutions for the Future of the Textile Industry

For the future we believe that the consumption and consequently the production of cotton clothes have to decrease. There is a large amount of over consumption today and he also thinks that the industry will turn to cheaper materials, since the price of the crude cotton is likely to rise substantially and that crude cotton will if not become scarce, at least will not be able to meet the future demand. About 250 billion articles of clothing is produced yearly, according to Bergman, intended for about 4 billion people, mainly living in the western parts of the world.

The future challenge for the industry will therefore be to come up with new types of materials and also dealing with recycling of clothes, i.e. second hand usage and creating new products from old textiles. In addition pure cotton fabrics are easy to re-use, but a lot of clothing today consists of mixed materials, which are much harder to recycle

Concerning the chemical industry, they have made progress during the last few decades when it comes to dying and coloring of textiles, where it today is fairly easy to get hold of and use environmentally friendly products. On the other hand, they still promote the use of pesticides in the farming stage. They look upon that from another perspective, saying that the guarantee of harvests each year, and larger crops combined with more than one crop per year, is also a way of working with sustainability, in that the efficiency and maybe quality of life is increased, at least financially, for 3rd world countries and its farmers.

We feel that the key to a more environmentally sustainable supply chain is transparency within the clothing industry, both within the supply chain, towards the colleagues and competitors in the industry, and towards the public. The textile and clothing industry is as 'dirty' as any other industry, and the supply chains within the industry will most likely never be perfect, but as long as companies make efforts and explain these efforts (whilst observing the areas of which they know they need to work harder on), customers who care about change and believe that it is possible for the world to be a green place, will embrace this. The same goes for the industry, if you can see where everything comes from, trace each thread back to the farmer, the secrets and uncertainty will be erased and a better cooperation and understanding will be created.

6.2. Future research

Who bares the responsibility for the future environment? Who bares the responsibility for sustainability in supply chains or changes in the farming of cotton, the factories producing the fabrics and clothes or the ginning and spinning processes from an environmental point of view?

Is it up to the governments, with the power to issue laws and regulations against the use of toxic substances and toxic waste products, to diminish environmental impacts? Or are the industries responsible for the production, supply chains, as well as what products to manufacture and how, by choosing what suppliers to work with? Is it further up to these companies to decide on internal guidelines and policies regarding environmental sustainability? In our research we also came across conflicting ideas on who within a clothing company should be responsible for the products' sustainability; should it be the designer or the purchasing professional?

There are a number of questions to be asked and issues to be discussed and developed further, concerning who should drive the changes and take the major responsibility for sustainable production and the environmental impacts.

In our research we came across researchers (Carter and Carter, 1998; Kellogg, 1994; Zsidisin. 2001) claiming that industry has to take responsibility for environmental sustainability within supply chains, before governments, but no further statements as to why. We found no research proving that maybe it should be the other way around either. Therefore we think this topic could be further researched.

For chemically grown cotton, there are often conflicting interests from different companies; the chemical companies encourages farmers to continue using their products and have been known to remove labels, such as warning texts and information of health hazards, from products sold to poor farmers in the third world. They also think that one aspect of sustainability is moving towards more efficient farming and harvesting, which then shows a positive effect of chemical cotton farming. The chemical industry and its goals and their relationship with the cotton industry/textile industry could be an interesting field to conduct research on.

It could also be interesting to continue looking at control of the supply chain from other angles than the environmental, i.e. looking at the social and financial aspects. The issue of control itself, and different methods of applying control could also be further looked into.

One suggestion is to continue investigating what has the largest impact when gaining control over your supply chain from en environmental point of view; management control, information flow, openness/cooperation with your peers, trust etc.

Further here is a lot of research to be done in finding new materials as well as research on new processes for recycling of cotton materials and mixed materials. This will probably become necessary or at least increasingly important in the future, as a growing population will demand more clothing and at the same time cotton.

The matter of trust is also an interesting field to investigate further. Trust is based on feelings and is difficult to define and determine by facts. What is trust? Is there a certain point when you start trusting someone, and how do you trust an entire organization or company? Is there even a point where you can claim to have 100 percent trust?

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APPENDIX 1

Question Frame for Interviews

1. How do you feel that you can guarantee the environmental sustainability of your cotton clothes through all steps of the supply chain?

2. Where, geographically speaking, is your cotton produced?

3. Do you feel you have any problems along the supply chain?

4. If yes - where?

5. Do you follow any international standards?

6. Are you a part of an organization that organize standards for you to follow?

7. How are the standards followed up? By whom? How often?

8. Do you feel that you are in control of your cotton supply chain? What steps are involved in your purchasing process? To what extent would you say that you are in control of the environmental sustainability level?

9. Is your aim to be fully in control?

10. Where do you feel you might have a weak spot in the control of the chain/sustainability of the chain?
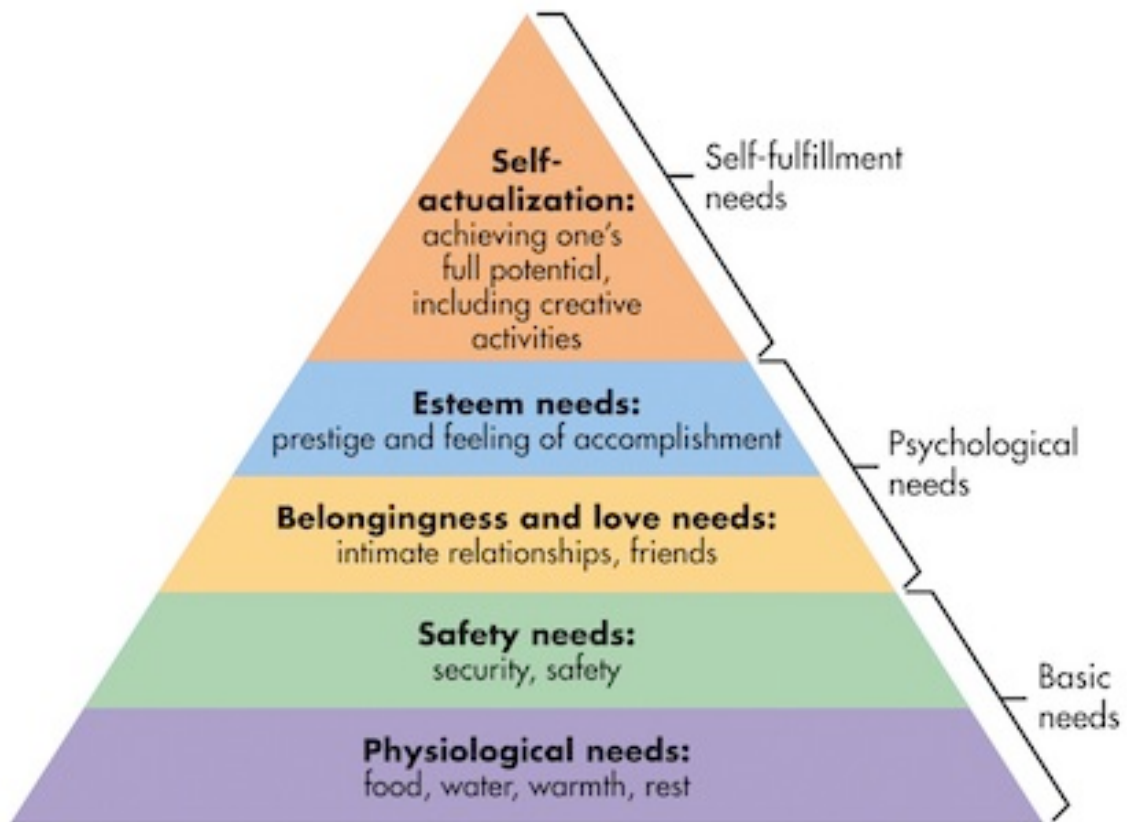
APPENDIX 2
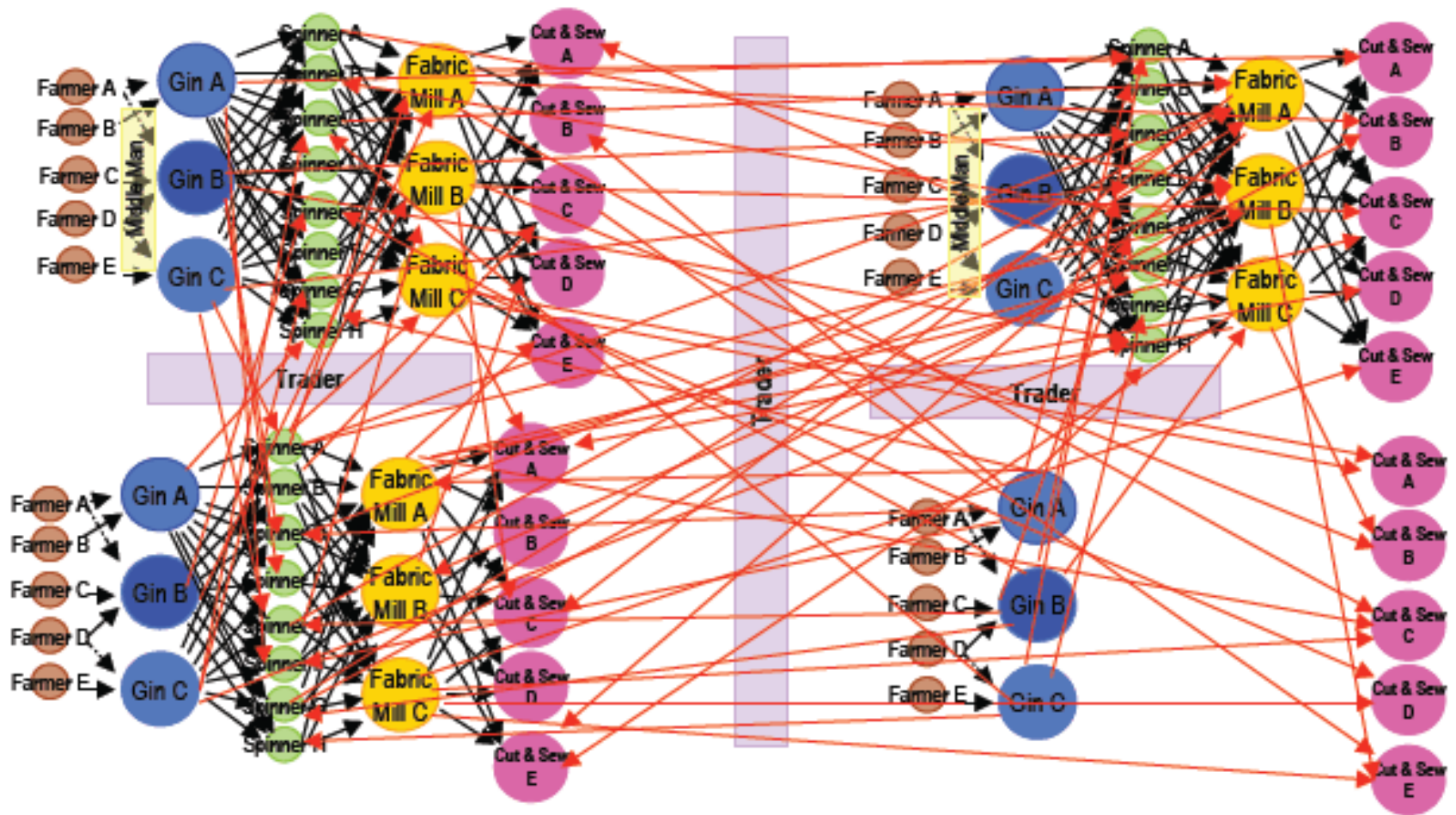
APPENDIX 3

Maslow's Hierarchy of Needs

APPENDIX 4